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The dental profession: promoting psychosocial well-being and not just treatment of oral disease

Oral health is part of general health and thus contributes to the overall health of an individual which cannot be limited simply to the absence of visible physical incapacity. The World Health Organization defines health as “complete state of physical, mental, and social wellbeing and not merely the absence of infirmity”.

Arising from this definition is the understanding that health is a multidimensional concept, and in pursuit of good oral health we ought to address all its dimensions, including: physical wellbeing, which is concerned with one’s ability to function or perform normal activities optimally; mental and psychological wellbeing, indicative that the individual’s cognitive capacities are intact, and that there is freedom from anxiety, fear, and negative emotional stressors; social wellbeing which includes participation in societal activities, and assuming one’s social functioning in a family, at work, and as a citizen.

This understanding has resulted in the development of models aimed at assessing the effects of treatment on health outcomes, such as symptoms, function, quality of life, perceptions of health, among others.

Oral health professionals are inundated with patients presenting with a variety of oral conditions which impact on their ability to eat (chew), speak, taste, smell and swallow. It is not uncommon for dental practitioners to limit clinical care to the management of complications like dry mouth, pain, infections, halitosis to the exclusion of important outcomes for the patient including social wellbeing, self-esteem and self-image. This manner of patient management is part of a long tradition in dental education, which focuses on the treatment of symptoms based on the medical model of care. The approach limits the nature and type of care that we can offer our patients and has a tremendous effect on the general wellbeing of patients.

Oral health professionals need to be cognizant of the impact of oral diseases and of their management on psychological wellbeing of their patients. Missing teeth are related to poor diet, inadequate nutritional density and dietary fibre and subsequent eventual weight loss. Missing teeth compromise facial appearance and aesthetics and could contribute to avoidance of social contact. Craniofacial problems like skeletal malocclusion (Class II and III), cleft lip and palate are deformities with attract negative social responses, discrimination and stigmatization. Sleep apnoea, a debilitating condition, leads to sleep deprivation, exhaustion and cognitive impairment. In addition, these patients suffer clinical depression, anger, irritability, and anxiety and total mood disturbances. Overall oral health quality of life of these patients is affected by poor clinical status, and the provision of inadequate dental care especially where psychosocial issues related to treatment are not given the attention they require.

Given that poor oral health may affect the sense of general health and happiness of an individual, it seems logical to conclude that dental practitioners may well benefit from an expansion of their scope of practice leading to their becoming more active contributors to the general health of the public. Improved general health through dental health may well lead to an improved self-image, and improved social interaction and self-esteem of the individual. Specific interventions such as the provision of a dental appliance could improve

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quality of sleep, or the correction of malocclusion through orthodontic braces could improve self-image. All these interventions demonstrate that oral health professionals have a role to play in improving the psychological wellbeing of their patients and of the population at large.

There is therefore an increasing need for oral health practitioners to adopt a more comprehensive approach in caring for their patients and the wider population than merely focussing on therapeutic and restorative care of teeth and managing other oral pathologies. The emphasis should be more on diligent assessment of determinants, on oral health promotion and on prevention of the consequences of oral diseases. In this way the time spent with the dental practitioner will be more meaningful and holistic for the patient. This approach would take us back to the contentions of Hart, that communities need “a new kind of doctor” who has more “social” rather than “technical” skills. This paradigm shift needs to begin with the reorientation of the training of dental professionals with a greater emphasis on providing students with a better understanding of the social context of disease, the context in which patients receive care and the social consequences of care and the lack thereof.

The Impending health care reform in the form of National Health Insurance (NHI) provides practitioners with ample opportunity to recognise and appreciate the social imperatives of disease and care. Furthermore, the re-engineering of primary health care with ward-based community health care outreach teams and district clinical specialist teams creates a platform through which future oral health care practitioners can be trained to work in partnership with other health professionals in the communities for the better patient care. This emphasises the need for inter-professional education and delivery of training in the communities in the form of service learning or community-based education.

In conclusion, the new generation of oral health practitioners must be acquainted with the psychosocial dimensions of disease and care, and engage in the multidisciplinary management of patients to improve the oral health outcomes and the overall quality of life for the clients. Oral health practitioners need to begin to take leadership in the development of strategies to improve quality of life through improved oral health and in influencing lifestyle decisions by advocating policy interventions on the social determinants of poor oral and general health, such as unhealthy diet, tobacco and alcohol use. This calls for an urgent development and implementation competency framework such as the CanMed in the training of the oral health professionals. Those currently in practice need to be empowered to become holistic health care providers. The coming issues of the South African Dental Journal will feature articles within the education theme of the role of oral health practitioners in improving psychological well-being. These articles would also provide the public on the broader scope of the oral health practitioner.

References
The most romantic of all Schubert’s symphonies, the Eighth, is most familiar to us as “The Unfinished”. Yet there is a mystery as to why it was never completed. After all, Schubert did produce a Ninth Symphony, some six years later. Why did the Eighth linger unattended? No real answer to that… but as far as it goes, the Eighth is a mastery of harmony, of melody and of the intricate blending of individual instruments. It also demonstrates enormous power over a great range. The promise is vast, the expectations, justifiably huge.

We too have an unfinished symphony in the Association for even with all the considerable advances and developments achieved over past years, we still require continuous commitments and efforts to meet the ever changing challenges facing dentistry today. The 2013/2014 Annual Integrated Report encompasses a multitude of activities and details the resolution of numerous dilemmas. Even in the face of the difficult financial status of the country, the Association has managed to emerge from that difficult year with a small operational excess. Considerable funds had to be expended in the pursuit of the best advantages for members in diverse actions which could impact on practice and principles. Matching that expenditure was a huge effort by those who direct the affairs of the Association. The Integrated Report reflects not only the achievements but also the forward plans, which are comprehensive and positive.

In recognising just how involved has been the Association, it was a matter of some surprise to learn that the most recent meeting of Council was completed quite comfortably in one day. Those who served on previous Councils will recall the protracted meetings, the long discussions, the intricate deliberations and cogitations! We may be reminded of another classic… The Bekkersdal Marathon, written by Herman Charles Bosman. What a story… evoking vivid images of a deeply religious community who were faced with a dominee who fell asleep at the pulpit having directed the congregation to sing Psalm 119 which has 176 verses! A marvellous reflection of a group who knew they had to meet the responsibilities of completing the Psalm …..and no one dreamt of waking the dominee! Those were the days when virtually every meeting of Council was its own Bekkersdal Marathon! (not that the Chairman ever went to sleep!!). Today the Association and the Council have the benefit of streamlined Committee workings, of concise reporting and of effective summaries of committee decisions. No marathon sessions even though we are in a state of development, a state of continuous endeavour. Our own Unfinished Symphony has its own Conductor, Lead violinist, Chief percussionist… the identities may change but the music is sustained …. although perhaps the Wind instruments need not be as vocal as before!

The Association will continue to develop and to advance… we need the power and the range offered by an active and involved membership. Let’s start by reading and absorbing the Integrated Annual Report.

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Congenital granular cell tumour: an unusual antenatal presentation with a 12-year follow-up

ABSTRACT
Congenital epulis, also known as congenital granular-cell tumour (CGCT) is a rare benign entity that occurs in neonates. The size and prominent location of the lesion(s) in the oral cavity ensures early recognition. This paper aims to provide a comprehensive background of this rare lesion and discusses the presentation in a neonate diagnosed at 35 weeks on a routine ultrasound. Oral health practitioners should be aware that these lesions may cause dental developmental anomalies at the site where they occur.

Key words: Congenital epulis in newborn, Granular cell tumour, EXIT procedure

INTRODUCTION
The congenital granular-cell tumour (CGCT) is a rare benign lesion of unknown origin found only in neonates. It has also been documented as a congenital epulis, granular cell tumour of infancy or epulis of the newborn. Since the first reported case by Neumann in 1871, about 200 cases have been cited in the dental literature.1 Its origin is uncertain but is thought to arise from the undifferentiated mesenchymal/stromal cells and is therefore thought to be non-odontogenic in origin.

The CGCT occurs ten times more frequently in females than in males.2 It appears sporadically with no known familial patterns of inheritance.3,4 Generally, the medical histories of the mothers reveal uncomplicated pregnancies, full term gestations and normal parturitions. Most affected children have been reported in Caucasian women.5 Although it usually presents as an isolated finding at birth, cases with strong associations with polyhydramnios, neurofibromatosis, XXX chromosome and polydactyly have also been reported.6,7 Occasionally, the lesions may be detected prenatally on a routine ultrasound examination but the findings are usually non-specific. Antenatal detection of this lesion has been reported in five cases during the 2nd and 3rd trimester by means of ultrasound examination8 with the earliest reported antepartum identification being made at the 29.5 weeks of gestation.9 The typical clinical appearance is that of a solitary, firm, pedunculated, flesh-pink coloured nodule located in the incisor or canine region of the alveolar ridge.10 The maxilla is three times more commonly affected than the mandible and multiple lesions (10%) have been reported by some authors.10,11 They vary in size ranging from several millimeters up to 9.0 centimeters in diameter, with larger tumours often showing superficial ulceration due to frictional trauma associated with bottle-feeding.4 Pathologic and radiographic investigations have confirmed that these are soft tissue tumours with no involvement of the underlying bone.12 Aesthetically, the CGCT may be alarming to parents because of a large size and aggressive appearance. Complications include dyspnoea, respiratory obstruction, cyanosis and an inability to close the mouth leading to difficulty in sucking and swallowing.1,9

The pathogenesis of CGCT is controversial and remains unknown. Odontogenic and epithelial origins, previously suggested, have now been discounted and more recent ultrastructural findings implicate gingival stromal cells in the histogenesis of this lesion.3 Clinical observations of a lack of postnatal growth, instances of spontaneous regression and non-recurrence after incomplete resection are consistent with this hypothesis.1,3

A provisional diagnosis of CGCT is often made at birth with a definitive diagnosis usually confirmed following histological examination and immune-histochemical staining. Histologically, the lesion consists of large eosinophilic granular cells within a vascular fibrous stroma. The lesional cells are positive for lysozyme, HLA-DR, macrophage marker CD68 and negative for S-100 protein as well as epithelial

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markers. S-100 protein antigen negativity, which is specific for Schwann cells, excludes a neurogenic etiology and aids in distinguishing between the CGCT and the granular cell tumour that appears after birth.

CASE REPORT

A 32 year old woman of Middle Eastern origin, gravida 4, was booked for an elective Caesarean section. After a normal screening ultrasound at 19 weeks gestation, examination of a second ultrasound at 35 weeks found a tumour extending from the mouth of the foetus (Figure 1). A large component of the lesion was confined to the mouth, but was also observed to extend 1-2cm beyond the lips on dynamic ultrasound. The well-circumscribed lesion appeared to arise from the maxillary alveolar process and its posterior extent was confined to the oral cavity (Figures 2A-C). The head was turned to the right during most of the time of the scan and on other occasions it was hyper extended in the sagittal plane. There appeared to be a swelling of the left cheek, which could have been continuous with the oral tumour. The neck and trachea appeared to be within normal anatomical limits.

A multidisciplinary meeting that included an obstetrician, paediatric surgeon, neonatologist and an anaesthetist was convened and the decision was made to deliver the baby electively by caesarean section using an EXIT (Ex Utero Intrapartum Treatment) Procedure. This unique technique is used to maintain foetal-placental circulation during partial delivery of the foetus with a potentially life threatening upper airway obstruction. Unfortunately, the patient went into labour the night before this planned operation and so the EXIT procedure was carried out as an emergency. Following general anaesthesia, the baby was intubated by a paediatric anaesthetist when the head came in view but before placental separation was made. A paediatric surgeon was on stand-by in the event that a surgical airway was required. Intubation was not difficult once the laryngoscope was placed past the tumour. After the baby was delivered, the oral tumour was seen to prolapse through the incision. The tumour was resected and sent for histological examination. The baby was admitted to neonatal intensive care and was discharged after 10 days.}

Figure 1: Ultrasound image at 35 weeks showing the lesion (pink) protruding from the mouth of the foetus.

Figure 2: Dynamic ultrasound image at 35 weeks showing the well circumscribed lesion (pink) confined to the oral cavity.

Figure 3: The preoperative appearance of the tumour showing a firm, protuberant mass with prominent blood vessels, prior to surgical procedure under general anaesthesia.

Figure 4: Section through the polypoid tumour showing a sheet-like arrangement of uniform granular cells with interspersed vascular spaces (H&E stain, magnification X160).

Figure 5: Higher magnification showing large polygonal cells with characteristic abundant granular cytoplasm and eccentric bland appearing oval nuclei and interspersed congested blood vessels (H&E stain, magnification X400).

Figure 6: Clinical photograph of the patient at the 12-year follow-up appointment.
the endotracheal tube was kept in-situ until the tumour was surgically removed later on that day.

The infant was transferred to the Neonatal Intensive Care Unit at the Children’s Hospital at Westmead for observation and a consultation was requested from the specialists in Paediatric Dentistry and Paediatric Surgery. The lesion measured 4x2x2 cms and arose from the alveolus on the right side of the maxillary alveolar gum pad (Figure 3). It was firm on palpation and the surrounding mucosa appeared normal. Large arterial feeder vessels were noted and were consistent with a vascular supply to a lesion of this size. The child was taken to the operating room the following evening to undergo an excisional biopsy of the lesion. The stalk of the lesion was tied off and the tumour completely excised. Haemorrhage was controlled with diathermy. There were no postoperative complications and the child was then transferred back to her mother in the postnatal ward where she was able to successfully breast feed. Healing was uneventful and the upper primary teeth erupted through the site of the surgery at approximately eight months of age.

Multiple sections of the lesion stained with hematoxylin and eosin were examined. They showed large polygonal cells containing granular eosinophilic cytoplasm and eccentrically placed nuclei located within a delicate fibrovascular connective tissue stroma (Figures 4, 5). A diagnosis of CGCT was made.

The patient continued to maintain her recall appointments with the hospital for many years and there has been no recurrence of the lesion, the most recent being her 12 year follow-up appointment (Figure 6).

**DISCUSSION**

Although the clinical presentation of a CGCT can be visually striking due to its size and reddish appearance, it is benign and does not recur following complete surgical excision. The lesions vary in size they and are not known to cause any damage to the developing dentition. Diagnosis is always confirmed by histological examination. The aetiology is unknown and most authors suggest a mesenchymal origin.3,16 With advancement in imaging technology, oropharyngeal lesions may be detected before the third trimester.16 Postnatal imaging such as ultrasonography or magnetic resonance imaging.17,18 However, they are rarely diagnosed prenatally by the utilisation of ultrasonography in imaging technology, oropharyngeal lesions may be firm on palpation and the surrounding mucosa appeared normal. Large arterial feeder vessels were noted and were consistent with a vascular supply to a lesion of this size. The child was taken to the operating room the following evening to undergo an excisional biopsy of the lesion. The endotracheal tube was kept in-situ until the tumour was surgically removed later on that day.

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The management of CGCT’s depends on the extent of the tumour and the site of origin with no standard protocols being documented in the current literature. They have a potential to complicate general anaesthesia by interfering with endotracheal intubation. The treatment options are either simple, conservative excision especially when major feeding or obstructive respiratory problems arise or a wait-and-watch approach due to the possibility of spontaneous involution or regression in smaller lesions.11,19 If the latter fails, then a non-radical excision at the tumour base is preferred at the age of 4-6 weeks. Wide radical excision is not required nor recommended due to the possibility of damage to the future development of the dentition and disfigurement of the soft tissues.4 Some clinicians have excised the lesion using carbon dioxide lasers.13 Regular follow-up is recommended to ensure early detection of very rare malignant transformation of the residual elements as well as to monitor the normal development of the facial bones and dentition.14 The antepartum identification of the lesion in this case made it possible to organise a multidisciplinary team to ensure maintenance of an adequate airway and early surgical intervention thereby resulting in a favourable outcome for the patient.

**Declaration:** No conflict of interest was declared.

**References**

Radiopacities in soft tissue on dental radiographs: diagnostic considerations

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SUMMARY
Radiopacities in soft tissue in the maxillofacial and oral region frequently manifest on panoramic radiographs in various locations and in several sizes and shapes. Accurate diagnosis is important as the finding may indicate serious disease states. This manuscript provides guidelines for the interpretation of soft tissue radiopacities seen on dental radiographs and recommends additional radiological views required to locate and diagnose the calcifications.

INTRODUCTION
Soft tissue radiopacities include calcification, ossification or foreign objects. The latter are excluded from this manuscript. Calcification is the deposition of calcium salts in tissue. The pathogenesis is based on either dystrophic or metastatic mechanisms. Dystrophic calcification, which comprises the majority of soft tissue calcifications in the head and neck region, is the result of soft tissue damage with tissue degeneration and necrosis which attracts the precipitation of calcium salts. The blood calcium concentration in these patients is normal. Appropriate examples are calcification of a focus of necrosis of tuberculosis, necrotic tumour tissue or of atheromatous plaque.

Metastatic calcification on the other hand results from the deposition of calcium salts in normal tissue in the presence of hypercalcemia secondary to metabolic causes such as hyperparathyroidism and skeletal deposits of malignant disease. Metastatic calcifications are therefore generally spread more widely throughout the body than dystrophic calcifications which tend to be more localized. The radiology literature is ambiguous in distinguishing between soft tissue calcification and ossification as the distinction can often only be made histologically. Soft tissue ossification is the formation of mature bone with or without bone marrow in an extra-skeletal site. Appropriate examples are elongation of the styloid process through ossification of the attached ligaments and bone formation in synovial chondromatosis.

Idiopathic calcification involves normal serum calcium concentration and healthy tissue, and can as such not be classified as either dystrophic or metastatic. Examples of this are tumorous calcinosis which presents with calcifications around joints and calcinosis cutis, which manifests in the cutaneous or subcutaneous tissue overlying the jaw bones. The latter two conditions are rare and will not be discussed further.

Dental practitioners are required to identify, diagnose, treat or refer for treatment all pathology identified on a radiograph. This paper is aimed at providing practitioners with insight into the differential diagnosis of soft tissue radiopacities seen on dental radiographs. In order to achieve this, a thorough knowledge of the anatomic structures in the head and neck area is important. Accurate interpretation relies on correct positioning of the head during radiographic examinations as this may influence the location and visibility of soft tissue radiopacities on the radiograph. Most calcifications require no further management, but there are several which, if not identified and managed appropriately, could have serious health consequences.

PARAMETERS FACILITATING ACCURATE INTERPRETATION
When radiopacities present as an incidental finding in a soft tissue site, it is of pivotal importance to perform a thorough clinical examination which includes history taking and palpation of the respective site. The anatomical position, number of radiopacities, shape- and size of the calcifications and their internal structure provide important guidelines for their accurate interpretation (Table 1).

ACRONYMS
CAC: calcified carotid plaque
CBCT: cone beam computed tomography
CTC: calcified triticeous cartilage
GHH: greater horn of hyoid bone
SHTC: superior horn of thyroid cartilage
Although most radiopacities are asymptomatic, symptoms may be helpful in establishing a diagnosis. The stylohyoid process arises from the inferior surface of the temporal bone and extends infero-mesially towards the pharyngeal wall. Two ligaments (stylohyoid and stylomandibular) and three muscles (stylohyoid, styloglossus, and styloglossus) originate from this process and together they are sometimes called the “stylohyoid chain.” Ossification of one or more of the components of the chain begins normally at the styloid process and can create the radiographic image of an elongated styloid process. The stylohyoid ligament is attached at the lesser horn of the hyoid bone and therefore stabilizes it. Patients with an ossified stylohyoid ligament may manifest with headaches, pain with swallowing, yawning, and with moving the head laterally, referred temporomandibular joint (TMJ) pain or recurrent throat pain due to impingement of the elongated process on adjacent structures. A symptomatic ossified stylohyoid ligament is referred to as Eagle syndrome and panoramic radiography showing a length of 3cm or more is sufficient to confirm the diagnosis (Figure 1).

A productive cough or history of tuberculosis may be an indication of tuberculosis lymphadenitis with dystrophic calcification of lymph nodes. Calcified lymph nodes are asymptomatic (unless secondarily infected) and may be seen as an incidental finding on a panoramic radiograph at the anatomic sites where lymph nodes are found.
The patient should be informed of the possible implications and referred for follow-up care to exclude active tuberculosis or other serious underlying diseases which could manifest with such calcifications.

Tinnitus or an affirmative history of a stroke, transient ischemic attacks or temporary loss of vision (ocular ischemia) may result from stenosis of the carotid artery due to atheromatous plaque, which is often heavily calcified (calcified carotid plaque or CAC, Figure 3). Calcifications in the walls of other arteries (e.g. facial artery) are site-specific and knowledge of the vascular anatomy is required for correct interpretation. In asymptomatic patients early recognition and appropriate referral of patients with CAC reduces morbidity and mortality by preventing vascular obstruction, which has the potential to result in cerebrovascular incidents, coronary heart disease and loss of vision. CAC and calcified cervical lymph nodes present with overlapping features and may be difficult to differentiate.

Another cause for dystrophic calcification in lymph nodes is necrotic metastatic malignant deposit which frequently occurs post chemo- or radio therapy. Swelling and pain upon salivation mainly during meals may prompt a clinical diagnosis of chronic submandibular sialadenitis due to the presence of one or more calcified submandibular sialoliths which obstruct the flow of saliva (Figures 4 and 5).

Tonsilloliths develop due to chronic inflammation of the tonsils. If large, they protrude from the tonsillar crypts and manifest clinically as yellow or white stones. Symptoms such as tonsillar swelling, pain, difficulty in swallowing, the sensation of a foreign object in the throat and halitosis may be present. A clinical diagnosis supported by multiple small radiopacities superimposed on the mid-ramus angle of the mandible on a panoramic view is sufficient for the diagnosis of tonsilloliths (Figure 6). If uncertain, CBCT examination can be performed which will confirm the location in the tonsillar bed.

Myositis Ossificans is dystrophic calcification within a muscle and is induced by trauma and haemorrhage and can be localized when affecting only one muscle or generalized, affecting several muscles. The muscles of mastication can be involved and the condition is therefore seen in their anatomical locations (Figure 7).

Synovial osteochondromatosis and tumoral calcinosis are rare disorders which more commonly affect major joints than the TMJ. Synovial osteochondromatosis is usually characterized by unilateral osteo-cartilagenous nodules in the synovium of the joint (Figure 8) and may be associated with pain and swelling, while tumoral calcinosis presents with painless nodular swelling in the soft tissue surrounding the TMJ. Some panoramic machines have special TMJ programs which facilitate the identification of radiodense deposits in and around the joint.

Calcifications of the laryngeal cartilage occur at an advanced age and present in the superior horn of the thyroid cartilage and the triticeous cartilage (Figure 9). Both structures occur bilaterally in the upper neck and may be located in the vicinity of the carotid bifurcation. These must be distinguished from CAC which may occur in the same anatomical site by employing additional radiological examinations. The superior 2 to 3mm of the superior horn of the thyroid cartilage, when calcified, is seen on a panoramic radiograph as a cord-like soft tissue calcification with the rounded top mesial to C4 (Figure 9). The triticeous cartilages are bilateral, well-defined single ovoid faint radiopaque structures located in the lateral thyrohyoid ligament at the level of C3 and C4 between the superior horn of the thyroid cartilage and the greater horn of the hyoid bone (Figure 9). The distal portion of the greater horn of the hyoid bone may be misinterpreted
as CAC as it is located in the region of the carotid bifurcation (Figure 9). Phleboliths are rare and associated with calcified thrombi in veins, hemangiomas or venous malformations of the oro-facial structures. They are most frequently localized in the cheek area, rarely in the neck and occur in both children and adults. Phleboliths are randomly distributed and present as regular and spherical radiopacities with mixed density, referred to as laminated or onion-like. When seen on dental radiographs, they might be confused with sialoliths, tonsilloliths or intrabony lesions. Their association with a vascular anomaly or hemangioma in hard- or soft tissue is, however pathognomonic. Calcified fibro-epithelial polyp and calcified gingival tumours e.g. peripheral ossifying fibroma are rare and may appear as regular or irregular oval radiopacities superimposed over the occlusal third of teeth.

ANCILLARY RADIOGRAPHIC TECHNIQUES

A combination of clinical-and dental radiographic examinations may confirm most soft tissue radiopacities and additional radiographic techniques can be employed to locate them. On panoramic radiographs salivary stones (sialoliths) in the duct of the submandibular salivary gland may be superimposed on the body of the mandible and mimic intra-bony radiopacities. It is beyond the scope of this manuscript to discuss the conditions manifesting as radiopacities within bone, however standard occlusal- or lateral oblique radiographs, the submentovertex projection, sialography or CBCT are pivotal in confirming the location outside bone and in the soft tissue of the floor of the mouth (Figure 5). Three-dimensional CBCT is a cost-ineffective alternative to these techniques. Parotid duct calculus may be differentiated from a bony lesion in the maxilla by placing a periapical film in the buccal vestibule opposite the duct and irradiating the area while the patient blows up the cheek. The exposure dose should be less than with hard tissue to prevent “burning out” of the less calcified salivary stones.

Panoramic radiography is not considered suitable for population-level screening for carotid stenosis. The reason is that only calcified carotid plaque is seen on panoramic radiographs and the presence of a calcification is not always indicative of non-calcified atheromatous stenosis. Panoramic radiographs are, however frequently prescribed during dental care, are non-invasive, cost effective and of good reliability when calcified carotid plaque is present. It has been reported that carotid stenosis of 50% and more is almost always calcified and detectable on panoramic radiographs. The diagnosis of CAC should however be confirmed by Duplex Doppler ultrasound or CBCT. Angiography, frontal radiography of the neck, cervical spine radiography, magnetic resonance imaging and conventional computed tomography have also been used for the detection or confirmation of calcified atheromatous plaque. Synovial chondromatosis, temporal calcinosis, antroliths and rhinoliths can be confirmed by examinations like CBCT or conventional computed tomography. Although antroliths (Figure 10) and rhinoliths are easily recognized on panoramic radiographs, extraoral radiographs such as the postero-anterior skull and the Waters projection are often helpful in confirming a suspicion of an antrolith or rhinolith respectively.

In general, incidental findings of soft tissue calcification in the neck may be life-saving especially in the case of carotid artery calcifications and tuberculosis. The dentist is advised to refer a patient with undiagnosed and possible life-threatening soft tissue calcifications in the neck for further examination.

Declaration: No conflict of interest was declared.

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NEW!

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N Warren¹, PJ van der Vyver², FS Botha³

SUMMARY
Introduction: Disinfection is the main objective of root canal preparation and whilst irrigation is most commonly used, another method is Photo-activated Disinfection (PAD).

Aims and Objectives: The aim of this in vitro study was to compare the efficacy of eradication of bacteria from root canals by six different disinfection protocols.

Methods: Root canals of 84 extracted human teeth were prepared to a standardised size and taper. The teeth were sterilised and then inoculated with E. faecalis. The teeth were randomly assigned to one of seven groups (n = 12), each of which underwent a different disinfection protocol. Dentine samples were plated onto BHI plates and incubated anaerobically. After five days, colony-forming units (cfu) were counted. The Pairwise Wilcoxon Rank Sum test and the Kruskal-Wallis test were used for statistical analysis of the data.

Results: The most effective disinfection protocol was: 3% NaOCl with 2% CHX, followed by 3% NaOCl with PAD, Chlor-XTRA and 2% CHX. The 3% NaOCl-protocol performed significantly better than PAD and distilled water. The PAD-protocol performed significantly better than distilled water.

Conclusion: The most efficient protocol in eradicating E. faecalis from the root canals was 3% NaOCl followed by irrigation with 2% CHX.

INTRODUCTION
The majority of persistent endodontic infections are strongly associated with the invasion of the pulp by facultative anaerobic bacteria.¹⁻³ Chemo-mechanical root canal preparation is crucial in endodontic treatment to ensure removal of the residual pulp tissue, fragments of dentine and pathogenic microorganisms.³ The chemical dissolution of these organic and inorganic components is equally important to the physical flushing action of irrigation solutions.⁵⁻⁷

Enterococcus faecalis is a gram-positive, facultative, anaerobic microorganism that is frequently implicated in persistent periapical infection.³⁻⁸⁻⁹

Mechanical root canal cleaning and shaping leads to the occlusion of dentinal tubes by a deposit referred to as a “smear layer”.¹⁰⁻¹¹ If this barrier is in place, debris and organic and inorganic matter remain in the tubules and resident bacteria are not killed.¹²⁻¹³

Removing the smear layer is accomplished most efficiently by rinsing the root canal with 0.5%-5.25% sodium hypochlorite (NaOCl) to dissolve and flush out the organic remnants, followed by rinsing with a liquid chelating agent (17% liquid ethylene-diamine-tetra-acetic acid, EDTA) to dissolve inorganic components.¹⁴⁻¹⁷

ACRONYMS
BHI: Brain Heart Infusion
Cfu: Colony-forming units
CHX: Chlorhexidine gluconate
EDTA: Ethylene-diamine-tetra-acetic acid
PAD: Photo-activated Disinfection
NaOCl: Sodium Hypochlorite

A commercially available endodontic irrigant, Chlor-XTRA (Vista Dental Products, Racine, Wisconsin, USA), is an improved NaOCl (5.25%) solution containing also a wetting agent, surface modifying agents to reduce surface tension and alkylating agents to increase electrical capacity.¹⁸ Chlorhexidine gluconate (CHX) is a cationic bis-guanide considered to be a broad-spectrum antimicrobial agent that can be used for root canal irrigation.⁴⁻¹⁹ Chlorhexidine molecules bind to hydroxyapatite crystals and to soft tissues resulting in a residual bacteriostatic phenomenon known as substantivity.¹⁶⁻²⁰ Chlorhexidine gluconate would in all probability be the ideal endodontic irrigant were it not for its incapacity to dissolve organic matter.²² An endodontic irrigation regime that includes
both CHX and NaOCl is beneficial in that the two solutions complement each other, one making up for the shortcomings of the other.\textsuperscript{23,24}

A relatively new method of disinfection is Photo-activated disinfection (PAD) in which, for endodontic therapy, a non-toxic photo-sensitive agent (dye) is placed into the prepared root canal. Molecules within the dye attach to contacting bacterial cells and act as markers. A light source is applied inside the canal to initiate a chemical reaction. The molecules within the dye become excited. Highly reactive "singlet" oxygen\textsuperscript{*} released from the dye has a toxic effect upon the "marked" bacterial cells, damaging their protoplasm, cell membrane and DNA. Ultimately this results in bacterial cell lysis and death.\textsuperscript{25,26}

The aim of this in vitro study was to compare the efficacy of six different root canal disinfection regimens in the eradication of E. faecalis from the root canals of human maxillary incisors. The disinfection efficacy was compared by microbiological culture.

\textsuperscript{*an electronically excited molecular oxygen known as dioxygen or dioxidene.}

**MATERIALS AND METHODS**

This in vitro study is based on a method modified from that first used by Haapasalo and Ørstavic in 1987\textsuperscript{27}, and applied successfully in many other experiments.\textsuperscript{5,28,29} Eighty four extracted single rooted teeth were collected. The teeth were then sterilised by autoclave (Hung-Lin Medical Instruments Co. Ltd.) at 121\textdegree C for 15 minutes. Before the inoculation procedure sterility of the root canals was assessed. Sterile paper points were inserted into the root canals of five randomly selected teeth. The paper points were placed onto Brain Heart Infusion (BHI) plates (Onderstepoort Biological Products Ltd.) which were incubated under facultative anaerobic conditions using Anaerocult A\textsuperscript{®} (Merck SA (Pty) Ltd.) at 37\textdegree C for three days. All cultures were negative, verifying that all the canals were sterile. The prepared teeth were randomly divided into seven groups (n=12) and the groups were placed into sterile glass containers. A McFarland standard 1 suspension (8 x 10\textsuperscript{8} colony-forming units) in BHI broth (Merck SA (Pty) Ltd.) was prepared from 48-hour cultures of E. faecalis (ATCC 49474).\textsuperscript{30} A 1\% inoculum of this was added to the teeth which were then incubated in a Vortex platform incubator (Ika-Works Inc. Germany) for 48 hours. Random dentine samples were taken from the prepared root canal of one tooth from each group, using a sterile round tungsten carbide bur size ISO 014 (Dentsply/Maillefer). The samples were placed onto BHI plates and incubated under anaerobic conditions (positive control). After 72 hours, numerous cfu\’s of the test organism were observed on the BHI plates. This served as confirmation that the root canals had been successfully inoculated with E. faecalis.

To each group was assigned a specific disinfection regime and the teeth treated according to that protocol (Table 1). The teeth were then split longitudinally. Three dentine samples were then sampled from one of the two sections (coronal, middle and apical) using a sterile round tungsten carbide bur size ISO 014. The dentine powder was

**Table 1: Disinfection protocols of the seven groups**

<table>
<thead>
<tr>
<th>Group</th>
<th>Irrigant/Treatment during minute 1</th>
<th>Irrigant/Treatment during minute 2</th>
<th>Irrigant/Treatment during minute 3</th>
<th>Irrigant/Treatment during minute 4</th>
<th>Irrigant/Treatment during minute 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3ml 3% NaOCl</td>
<td>3ml 3% NaOCl</td>
<td>3ml 3% NaOCl</td>
<td>3ml 3% NaOCl</td>
<td>3ml distilled water</td>
</tr>
<tr>
<td>2</td>
<td>3ml 2% CHX</td>
<td>3ml 2% CHX</td>
<td>3ml 2% CHX</td>
<td>3ml 2% CHX</td>
<td>3ml distilled water</td>
</tr>
<tr>
<td>3</td>
<td>3ml Chlor-XTRA</td>
<td>3ml Chlor-XTRA</td>
<td>3ml Chlor-XTRA</td>
<td>3ml distilled water</td>
<td>3ml distilled water</td>
</tr>
<tr>
<td>4</td>
<td>3ml 3% NaOCl</td>
<td>3ml 3% NaOCl</td>
<td>3ml 3% NaOCl</td>
<td>3ml 2% CHX</td>
<td>3ml 2% CHX</td>
</tr>
<tr>
<td>5</td>
<td>3ml 3% NaOCl</td>
<td>3ml 3% NaOCl</td>
<td>3ml 3% NaOCl</td>
<td>3ml distilled water</td>
<td>3ml distilled water</td>
</tr>
<tr>
<td>6</td>
<td>Toluidine chloride with PAD</td>
<td>Toluidine chloride with PAD</td>
<td>3ml distilled water</td>
<td>Toluidine chloride with PAD</td>
<td>Toluidine chloride with PAD</td>
</tr>
<tr>
<td>7 (control)</td>
<td>3ml distilled water</td>
<td>3ml distilled water</td>
<td>3ml distilled water</td>
<td>3ml distilled water</td>
<td>3ml distilled water</td>
</tr>
</tbody>
</table>

The aim of this in vitro study is to compare the efficacy of six different root canal disinfection regimens in the eradication of E. faecalis from the root canals of human maxillary incisors. The disinfection efficacy was compared by microbiological culture.

The root canals were prepared using ProTaper Universal (Dentsply/Maillefer, Baalgauges, Switzerland) Nickel Titanium rotary endodontic files. The two shaper files S1 and S2 were used for crown-down preparation. Then the finisher files were used from the F1 to the F3 file, according to the manufacturers’ instructions. A standardised taper was produced with a size 45, 6\% taper ProFile (Dentsply/Maillefer) rotary file. During preparation, copious amounts of 3\% NaOCl (Rekitt Benckiser, South Africa (Pty) Ltd., Elandsfontein, Gauteng, South Africa) were used for root canal irrigation. After preparation the following sequential irrigations were completed for each canal:

- 3\% NaOCl for five minutes
- distilled water for two minutes.
- 17\% EDTA (Vista Dental Products, Toronto, Canada) for one minute.
- distilled water for two minutes.

The teeth were then sterilised by autoclave (Hung-Lin Medical Instruments Co. Ltd.) at 121\textdegree C for 15 minutes. Before the inoculation procedure sterility of the root canals was assessed. Sterile paper points were inserted into the root canals of five randomly selected teeth. The paper points were placed onto Brain Heart Infusion (BHI) plates (Onderstepoort Biological Products Ltd.) which were incubated under facultative anaerobic conditions using Anaerocult A\textsuperscript{®} (Merck SA (Pty) Ltd.) at 37\textdegree C for three days. All cultures were negative, verifying that all the canals were sterile. The prepared teeth were randomly divided into seven groups (n=12) and the groups were placed into sterile glass containers. A McFarland standard 1 suspension (8 x 10\textsuperscript{8} colony-forming units) in BHI broth (Merck SA (Pty) Ltd.) was prepared from 48-hour cultures of E. faecalis (ATCC 49474).\textsuperscript{30} A 1\% inoculum of this was added to the teeth which were then incubated in a Vortex platform incubator (Ika-Works Inc. Germany) for 48 hours. Random dentine samples were taken from the prepared root canal of one tooth from each group, using a sterile round tungsten carbide bur size ISO 014 (Dentsply/Maillefer). The samples were placed onto BHI plates and incubated under anaerobic conditions (positive control). After 72 hours, numerous cfu’s of the test organism were observed on the BHI plates. This served as confirmation that the root canals had been successfully inoculated with E. faecalis.
collected over separate sterile pre-weighed Bijou bottles (Merck SA (Pty) Ltd.). The weight of the collected dentine was determined and the weight/volume concentration of each sample was calculated. This concentration was used to quantify the amount of viable \( E. \text{faecalis} \) that survived in each root canal.

One millilitre of sterile saline was added to the dentine in the Bijou bottles. The cfu were determined as follows: ten-fold dilutions were made in sterile quarter-strength Ringers solution. A quantity of 1ml of 10\(^{-3}\) to 10\(^{-7}\) of these dilutions was plated onto BHI agar plates.31 The BHI plates were incubated at 37 \(^{\circ}\)C for five days in facultative anaerobic conditions using Anaerocult A ®. Colony forming units were counted after a period of five days.

Data were collected and submitted to a statistician. A pairwise comparison of the cfu counts of all seven treatment groups was done using the Pairwise Wilcoxon Rank Sum test and the Kruskal-Wallis test. Results

The results of this study are presented in Tables 2 and 3. The results were analysed using the Pairwise Wilcoxon Rank Sum test and a non-parametric analogue of the one-way ANOVA test, the Kruskal Wallis test.

RESULTS

The results of this study are presented in Tables 2 and 3. The results were analysed using the Pairwise Wilcoxon Rank Sum test and the Kruskal-Wallis test. A comparison of the cfu counts of all seven treatment groups is presented in Table 2. Of the six test groups, the irrigation regimen of 3% NaOCl combined with 2% CHX was the most effective in eradicating \( E. \text{faecalis} \) from the root canals. In descending order of efficacy, this protocol was followed by: 3% NaOCl in combination with PAD, Chlor-XTRA and 2% CHX. The protocols that performed the most poorly in this in vitro study were 3% NaOCl alone and PAD alone.

The Pairwise Wilcoxon Rank Sum test showed that there were no statistically significant differences between the disinfection effects of 2% CHX, Chlor-XTRA or 3% NaOCl/ PAD protocols. That using 3% NaOCl combined with 2% CHX was significantly more efficient than 2% CHX alone. PAD, 3% NaOCl and distilled water were significantly less efficient than the other disinfection protocols. The results of the group in which PAD was used did show that this method was statistically more effective in eradicating the test organism than was distilled water.

DISCUSSION

In this in vitro study comparing the efficacy of six different root canal disinfection regimens, \( E. \text{faecalis} \) was chosen as the test organism for its resilient, resistant nature,32,33,34 whilst the extracted tooth model has been shown to be a reliable method in the evaluation of the bactericidal effects of root canal irrigants.35 In an attempt to remove the smear layer which is formed during root canal preparation, 2.5% NaOCl was used for irrigation during preparation of the samples and 17% EDTA as the final rinse (continuous passive irrigation) for one minute.36,37,38

The combination of 3% NaOCl and 2% CHX was slightly more efficient at eradicating \( E. \text{faecalis} \) from the root canals than were the five other disinfection regimens that were tested. However, Vianna and Gomes (2009) found no enhancement of the bacterial eradication ability of CHX by using it in combination with NaOCl.39 Baca et.al (2011) showed a 100% increase in bactericidal rate when 2.5% NaOCl irrigation was followed by a final rinse with 2% CHX.24 Their study showed that under ideal conditions 2% CHX was able to destroy bacterial biofilm within two minutes, a finding supported by several other investigations.24,40

In contradiction to some literature, the results of the present study indicate that 3% NaOCl is not the best irrigation solution. However, one other paper does report a

Table 2: Kruskal Wallis test comparing the variable cfu counts of all seven treatment groups (\( H_0 = \text{null hypopthesis} \))

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>N</th>
<th>Sum of Scores</th>
<th>Expected Under ( H_0 )</th>
<th>Std Deviation Under ( H_0 )</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>3% NaOCl</td>
<td>36</td>
<td>6123.00</td>
<td>4554.0</td>
<td>386</td>
<td>170.</td>
</tr>
<tr>
<td>2% CHX</td>
<td>36</td>
<td>3113.00</td>
<td>4554.0</td>
<td>386</td>
<td>86</td>
</tr>
<tr>
<td>Chlor-XTRA</td>
<td>36</td>
<td>2619.00</td>
<td>4554.0</td>
<td>386</td>
<td>73</td>
</tr>
<tr>
<td>3% NaOCl / 2% CHX</td>
<td>36</td>
<td>2370.50</td>
<td>4554.0</td>
<td>386</td>
<td>66</td>
</tr>
<tr>
<td>3% NaOCl / PAD</td>
<td>36</td>
<td>2485.00</td>
<td>4554.0</td>
<td>386</td>
<td>69</td>
</tr>
<tr>
<td>PAD</td>
<td>36</td>
<td>7342.50</td>
<td>4554.0</td>
<td>386</td>
<td>204</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>7824.50</td>
<td>4554.0</td>
<td>386</td>
<td>217</td>
</tr>
</tbody>
</table>

Average scores were used for ties.

Table 3: Significant differences between the cfu counts of all seven disinfection treatment groups. (Level of significance: \( p< 0.05 \))

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>3% NaOCl</th>
<th>2% CHX</th>
<th>Chlor-XTRA</th>
<th>3% NaOCl / 2% CHX</th>
<th>3% NaOCl / PAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>3% NaOCl</td>
<td>p &lt; 0.0001</td>
<td>p &lt; 0.0001</td>
<td>p &lt; 0.0001</td>
<td>p &lt; 0.0001</td>
<td>p &lt; 0.0001</td>
</tr>
<tr>
<td>2% CHX</td>
<td></td>
<td>p &lt; 0.0001</td>
<td>p &lt; 0.0001</td>
<td>p &lt; 0.0001</td>
<td>p &lt; 0.0001</td>
</tr>
<tr>
<td>Chlor-XTRA</td>
<td></td>
<td></td>
<td></td>
<td>p &lt; 0.0001</td>
<td>p &lt; 0.0001</td>
</tr>
<tr>
<td>3% NaOCl / 2% CHX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p = 0.0487</td>
</tr>
<tr>
<td>PAD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p &lt; 0.0001</td>
</tr>
<tr>
<td>Distilled Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p &lt; 0.0001</td>
</tr>
</tbody>
</table>
poor performance of this solution.\textsuperscript{41} The most likely reason for this inefficiency may be that the concentration of 3% NaOCl is not sufficiently potent to completely eradicate \textit{E. faecalis} from infected dentine within the time of exposure to the irrigant.

There are few studies specifically investigating Chlor-XTRA as an irrigation solution. In 2012 Jungbluth et al. compared the activity of Chlor-XTRA with that of several brands of household bleach (NaOCl).\textsuperscript{42} The results of this study indicate that Chlor-XTRA (5.25% NaOCl) was significantly better than 3% NaOCl at eradicating \textit{E. faecalis} as also confirmed by several other studies.\textsuperscript{43-44}

Souza et al. found that PAD applied with either methylene blue (MB) or toluidine blue (TB) did not significantly enhance root canal disinfection compared to chemo-mechanical preparation using NaOCl as an irrigant followed by PAD.\textsuperscript{45} The results of this present investigation, supported Souza’s findings whether PAD was used after conventional irrigation with 3% NaOCl or was used alone. In fact, high numbers of \textit{E. faecalis} cells were found in the PAD only treatment group. Several contradictory conclusions have been reported. Soukos et al. showed PAD to be 97% effective in reducing \textit{E. faecalis} when applied alone for root canal disinfection\textsuperscript{46} whilst Foschi et al. also observed good results with the system, finding that PAD used with a diode laser achieved a bacterial reduction of 77.5%.\textsuperscript{47} In 2010, Schlafer et al. demonstrated a 99.7% reduction of the bacteria in suspension and a 95.82% reduction in the quantum of bacteria in adherence to the root canal wall.\textsuperscript{48} The number of viable \textit{E. faecalis} cells in the root canal was reduced to 2.9% when Rios et al. treated root canals with PAD for 30 seconds alone and, when PAD was applied after NaOCl, they observed a reduction down to 0.1%.\textsuperscript{49}

Irrigation with distilled water had no significant effect on the number of bacteria in the root canals.

Further studies should be carried out to determine the best application of the NaOCl/CHX solution combination regimen for endodontic irrigation. Additional studies need to be carried out to determine whether the additional time, effort and expense needed to apply PAD as a supplementary method of root canal disinfection is justifiable or not.

CONCLUSIONS

Whilst this study failed to identify any regime as offering complete eradication of \textit{E. faecalis} it may be concluded that 3% NaOCl used in combination with 2% CHX will offer the clinician the best option to achieve the desired disinfection of the root canal.

Acknowledgements

The authors would like to thank Prof H.S. Schoeman for statistical analysis of the results. The authors acknowledge that funding for this research project was obtained from the Professor Cornelis H Pameijer Fellowship.

References

Effectiveness of pictorial sign boards for patient navigation in multidisciplinary Dental Facilities

ABSTRACT

Objectives: Evaluation of the effectiveness of pictorial sign (symbol) boards in the identification of clinics/departments and in directing traffic in dental schools and hospitals.

Methods: Sign Boards (PSB’s) were designed to illustrate dental clinical disciplines. 260 subjects were briefly instructed in the roles of these disciplines. A first questionnaire required participants to match PSB’s with departments, and to identify the best PSB. A second questionnaire asked participants to rate how appropriate was the depiction of each department and to comment on the importance of PSB’s in a multidisciplinary dental set-up.

Results: The PSB of Oral & Maxillofacial Surgery (100%) was rated the most easily recognised, followed by the PSB’s of Orthodontics & Dentofacial Orthopedics (99.6%), Public Health Dentistry (99.6%) and Oral Medicine & Radiology (99.2%). Least identifiable were the PSB’s of Conservative Dentistry & Endodontics (86.2%) and Periodontology (85.8%). The PSB’s were generally approved, that for Orthodontics & Dentofacial Orthopedics gaining the highest rating, while those for Conservative Dentistry & Endodontics and for Periodontology scored the least. 97.3%-99.2% of the subjects agreed that PSB’s would be valuable in dental clinics/hospitals to facilitate patient navigation.

Conclusion: Pictorial Sign Boards are indicated in dental facilities.

Key words: Sign, Symbol, Pictorial Sign Boards, Dentistry, Effectiveness, Navigation

INTRODUCTION

Patients in the health sector are consumers (or customers) who demand cost effective quality service delivered at their convenience. Therefore it is important for any health institution to render services with optimum efficiency. A prime objective is the prompt provision of information needed by patients to navigate the facility. An efficient and popular method, advocated by various hospitals, is through the introduction of relevant pictograms/symbols/signs at strategic locations. They are an easy and efficient mode of non-verbal communication, and may be adapted for diverse purposes. In hospitals, symbols depicting specific body parts (such as eye, ear, bone, brain etc.) provide easy identification of individual disciplines by the patients, but of course the use of symbols is not limited to the medical profession. Indeed, such symbols, including metonymic emblems, can illustrate the evolutionary path of dentistry as a profession. However, it is complicated and possibly inappropriate to use a tooth as single universal symbol in the endeavour to depict the treatment rendered by the different specialties.

Departments in a dental facility are most frequently recognized by a number (1,2,3..), and/or by the speciality name (Endodontics, Prosthodontics etc.). However, not every patient is able to read nor be well versed in the scientific names of the different dental disciplines, which can be difficult to interpret, memorize, and/or recall, and in any event may not be precisely descriptive of the treatment rendered. The use of numbers can also be confusing. Thus it is quite possible that a patient has to be repeatedly directed to the particular department or departments.

The use of pictorial signs (symbols) to highlight a specific speciality in a multi-speciality facility may confer certain advantages:

1. Ease of interpretation
2. Visual appeal
3. Better memory retention
4. Universally applicable
5. Leaves a long-lasting impression

Thus, this study was designed and conducted to evaluate the effectiveness and importance of Pictorial Sign Boards (PSB’s), for trafficking and/or navigation of patients/visitors, in multidisciplinary dental facilities like dental schools, clinics and hospitals.
MATERIALS AND METHODS
The study was conducted at two dental clinics/hospitals associated with Manipal College of Dental Sciences, Manipal University, Mangalore City, Karnataka, India. Approval was obtained from the University Ethical committee before the commencement of the project. A total of 260 subjects, including patients and visitors, were selected randomly for the study. Informed consent was obtained from each participant. The study was conducted in three phases (Phase I, II, & III). Subjects were interviewed using two structured questionnaires based on simple terminologies for easy comprehension.

Designing Pictorial Sign Boards (PSB’s).
For the study, Pictorial Sign Boards (PSB’s) were designed to represent the eight clinical specialties in dentistry as recognized by the Dental Council of India (Copyright: “Malhotra’s Dental Specialties Pictorial Sign’s”. Reg No: A-97826/2013) (Figure 1). The PSB’s were designed to emphasise the most important treatment function of the concerned departments and not to attempt to describe the whole array of treatments which may have been rendered by that particular dental speciality. The study aims to test the effectiveness of these individually designed PSB’s.

Phase I
The subjects were informed and/or educated, in a language of their choice, regarding the eight different dental clinical specialties/departments. General layman terms were used to ensure that each subject understood the role of each specialty/department (Table 1). A notice board was installed in the patient reception area, displaying, in both the local language and in English, information regarding the different departments, their scientific names and the treatment rendered.

Figure 1: Designed Pictorial Sign Boards (PSB’s)” depicting the eight clinical specialties
(Copyright: “Malhotra’s Dental Specialties Pictorial Sign’s”. Reg No.: A-97826/2013)

Table 1: Individual Speciality Description and their Pictorial Sign/Symbols

<table>
<thead>
<tr>
<th>Speciality Name (as recognised by DCI)</th>
<th>Technical Terms</th>
<th>Layman Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Medicine &amp; Radiology</td>
<td>Initial Clinical Examination</td>
<td>General Check-up</td>
</tr>
<tr>
<td></td>
<td>Dental Records</td>
<td>X-rays</td>
</tr>
<tr>
<td></td>
<td>Radiographs</td>
<td></td>
</tr>
<tr>
<td>Conservative Dentistry &amp; Endodontics</td>
<td>Operative Procedures</td>
<td>Tooth filling</td>
</tr>
<tr>
<td></td>
<td>Root Canal Treatment</td>
<td>Dead tooth treatment</td>
</tr>
<tr>
<td>Oral &amp; Maxillofacial Surgery</td>
<td>Extraction/Impaction Maxillofacial Surgeries</td>
<td>Tooth Removal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jaw Fracture Treatment</td>
</tr>
<tr>
<td>Orthodontics &amp; Dentofacial Orthopedics</td>
<td>Correction of Tooth Alignment &amp; Occlusion</td>
<td>Tooth Straightening</td>
</tr>
<tr>
<td>Prosthodontics and Crown &amp; Bridge</td>
<td>Complete Dentures Removable Partial Denture Fixed Partial Dentures</td>
<td>Replacement of Missing/ Lost Teeth</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Periodontology</td>
<td>Treatment of Gingival and Periodontal Problems</td>
<td>Teeth Cleaning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Treatment of Gum Diseases</td>
</tr>
<tr>
<td>Paedodontics &amp; Preventive Dentistry</td>
<td>Dental Treatment Aspect of Children up to 14years of Age</td>
<td>Child Dental Treatment</td>
</tr>
<tr>
<td>Public Health Dentistry</td>
<td>Community Dental Health Dental Health Awareness School Dental Programs</td>
<td>Organization of Camps at Community Health Center and Schools</td>
</tr>
</tbody>
</table>

Table 2: Questionnaire I

| Question 1. | If you want a dental check-up / X-ray, which department would you go to? | Picture number_______ |
| Question 2  | If you want cleaning of your teeth and gum treatment, which department would you go to? | Picture number_______ |
| Question 3  | If you want a tooth removal, which department would you go to? | Picture number_______ |
| Question 4  | If you want a tooth filling, which department would you go to? | Picture number_______ |
| Question 5  | If you want false teeth sets /dentures or crowns, which department would you go to? | Picture number_______ |
| Question 6  | If you want dental treatment for your child, which department would you go to? | Picture number_______ |
| Question 7  | If you want wire/ braces for straightening of teeth, which department would you go to? | Picture number_______ |
| Question 8  | If you want to organize a dental camp, which department would you go to? | Picture number_______ |
Phase II (Questionnaire I)
The subjects were shown eight PSB pictures representing the eight different clinical dental specialties. The pictures were numbered from 1-8 in no particular order. Participants were asked to complete Questionnaire I, which was provided with layman terms describing each of the eight departments (Table 2). The subjects were asked to write, below each of the eight questions, the PSB picture number that best suited the description of the department in question.

Phase III (Questionnaire II)
The last phase involved the completion of Questionnaire II by the subjects. There were a total of 11 questions. The first eight questions required the participant to rate the PSB provided for each of the eight departments, for each of which was recorded the correct name, picture number, and the treatment rendered, the latter in layman’s terms. A Likert-type rating on a 1 to 5 scale was used to grade the response as follows:

1 - Strongly disagree
2 - Disagree
3 - Don’t know
4 - Agree
5 - Strongly agree

The responses for questions 9-11 were graded as either “yes”, “no”, or “do not know”. Questions 9 sought an opinion on the need for introducing PSB’s for individual departments as an identification tool for patients/visitors. Question 10 enquired whether the PSB would help the patient to easily identify the department. Finally the subjects were asked whether they considered it better to have individual signs/symbols rather than the conventional display of Names and Numbers of each individual department/specialty.

The data collected from the structured questionnaire was subjected to statistical analysis using statistical software SPSS11 package (SPSS for Windows, Version 11.0.0; SPSS Inc, Chicago, Ill). The comparison of the Likert Scale Ratings for the various PSB’s was done using the chi-square test (p< 0.05).

RESULTS
Questionnaire I
The frequency and percentage of correct identification of the PSB’s of individual departments are summarized in Table 3.

All 260 subjects correctly identified the sign board of the Department of Oral & Maxillofacial Surgery (Tooth Removal/Fracture Treatment). This was followed by a high percentage of correct responses in the Department of Periodontology (85.8%), Oral Medicine & Radiology (99.2%), and Orthodontics & Dentofacial Orthopedics (99.6%). The least correct responses were recorded in the Department of Paedodontics & Preventive Dentistry (98.8%).

Questionnaire II
The frequency and percentage of Likert Scale ratings for the various PSB’s are summarized in Table 4.

Table 3: Correct Response Rate & Percentages of Questionnaire I

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Treatment Description</th>
<th>Department</th>
<th>Correct Response</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dental Check Up/X-Ray</td>
<td>Oral Medicine &amp; Radiology</td>
<td>258</td>
<td>99.2</td>
</tr>
<tr>
<td>2</td>
<td>Cleaning Of Teeth</td>
<td>Periodontology</td>
<td>223</td>
<td>85.8</td>
</tr>
<tr>
<td>3</td>
<td>Tooth Removal/Fracture Treatment</td>
<td>Oral &amp; Maxillofacial Surgery</td>
<td>260</td>
<td>100.0</td>
</tr>
<tr>
<td>4</td>
<td>Tooth Filling/Dead Tooth Treatment</td>
<td>Conservative Dentistry &amp; Endodontics</td>
<td>224</td>
<td>86.2</td>
</tr>
<tr>
<td>5</td>
<td>False Teeth Sets/ Crowns</td>
<td>Prosthodontics and Crown &amp; Bridge</td>
<td>257</td>
<td>98.8</td>
</tr>
<tr>
<td>6</td>
<td>Child Dental Treatment</td>
<td>Paedodontics &amp; Preventive Dentistry</td>
<td>257</td>
<td>98.8</td>
</tr>
<tr>
<td>7</td>
<td>Straightening of Teeth</td>
<td>Orthodontics &amp; Dentofacial Orthopedics</td>
<td>259</td>
<td>99.6</td>
</tr>
<tr>
<td>8</td>
<td>Organize Dental Camp</td>
<td>Public Health Dentistry</td>
<td>259</td>
<td>99.6</td>
</tr>
</tbody>
</table>

Table 4: Response Rate & Percentage of Likert Scale Rating’s for Question 1-8 of Questionnaire II

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Department</th>
<th>5 Strongly Agree</th>
<th>4 Agree</th>
<th>3 Don’t know</th>
<th>2 Disagree</th>
<th>1 Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>Oral Medicine &amp; Radiology</td>
<td>57</td>
<td>21.9%</td>
<td>201</td>
<td>77.3%</td>
<td>2</td>
</tr>
<tr>
<td>Q2</td>
<td>Periodontology</td>
<td>32</td>
<td>12.3%</td>
<td>184</td>
<td>70.8%</td>
<td>32</td>
</tr>
<tr>
<td>Q3</td>
<td>Oral &amp; Maxillofacial Surgery</td>
<td>116</td>
<td>44.6%</td>
<td>141</td>
<td>54.2%</td>
<td>3</td>
</tr>
<tr>
<td>Q4</td>
<td>Conservative Dentistry &amp; Endodontics</td>
<td>42</td>
<td>16.2%</td>
<td>189</td>
<td>72.7%</td>
<td>19</td>
</tr>
<tr>
<td>Q5</td>
<td>Prosthodontics and Crown &amp; Bridge</td>
<td>47</td>
<td>18.1%</td>
<td>203</td>
<td>78.1%</td>
<td>8</td>
</tr>
</tbody>
</table>
| Q6           | Paedodontics & Preventive Dentistry | 60 | 23.1% | 197 | 75.8% | 1 | 0.4% | 5 | 0.8%
| Q7           | Orthodontics & Dentofacial Orthopedics | 123 | 47.3% | 136 | 52.3% | - | 1 | 0.4% | - |
| Q8           | Public Health Dentistry | 66 | 25.4% | 188 | 72.3% | 1 | 0.4% | 5 | 1.9% |
For the purpose of statistical analysis and to make the results more sensitive, the variables were dichotomized and only the scores for the frequency of the Strongly Agree and Agree responses were taken into consideration (Table 5). A chi-square test was applied to derive the association between the total frequencies of Strongly Agree and Agree responses for the PSB’s of individual departments. No statistically significant difference was observed (Table 5).

The response rate for Questions 9-11 is summarized in Table 6. An overwhelming majority (99.2% n=258) of the subjects agreed that PSB’s are needed and should be introduced in a dental clinic/hospital. Regarding department identification via PSB, 97.3% of the respondents agreed that the system will definitely help the patients/visitors to identify the respective departments more easily. However, only 91.5% of the subjects agreed that the display of a PSB is better than the display of individual Department Name and Number, with a statistically significant difference ($p=0.034$) between the subjects who strongly agree and who agree.

**DISCUSSION**

Symbology is the study of symbols, which is considered as the oldest language of humans. Symbols/signs play an important role in our day-to-day life and activities. Use of symbols/signs/emojis/pictograms is not new in health sciences as they are of value to enrich the personnel as well as professional life. They have also been an important means of non-verbal communication for the public in general; whether for the easy interpretation of data/statistics or to signify the goals, standards and principles of an organisation/association. Based on the same analogy, the majority of the subjects in this study (97.3%) agreed that the shown Pictorial Sign Board (PSB) will help to identify the individual departments while 99.2% considered that the system should be introduced in a multi-speciality dental facility (School/Clinic/Hospital). The literature supports the importance of such visual representations as an effective means of non-verbal communication. This reduces the duplication and ambiguity that are inevitable when individuals use different words to signify similar things. PSB’s may also reduce the confusion about the various departments and their locations in a clinical set-up and the time spent in explanations to patients. In any multispeciality dental facility, the most common and perhaps preferred route of department identification is through the display of the individual specialty names and office number. Despite the basic drawbacks, the patients and/or visitors are highly accustomed to this conventional identification system. This familiarity may explain why 8.5% of the subjects did not consider the introduction of PSB’s to be better than the use of department names and office number for their identification.

Table 5: Result of Chi-square Test as applied to Questions 1-8 of Questionnaire II

<table>
<thead>
<tr>
<th>Department</th>
<th>Chi-square value</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Medicine &amp; Radiology</td>
<td>0.243</td>
<td>1</td>
<td>0.622</td>
</tr>
<tr>
<td>Periodontology</td>
<td>1.332</td>
<td>1</td>
<td>0.248</td>
</tr>
<tr>
<td>Oral &amp; Maxillofacial Surgery</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Conservative Dentistry &amp; Endodontics</td>
<td>0.423</td>
<td>1</td>
<td>0.515</td>
</tr>
<tr>
<td>Prosthodontics and Crown &amp; Bridge</td>
<td>0.366</td>
<td>1</td>
<td>0.545</td>
</tr>
<tr>
<td>Paedodontics &amp; Preventive Dentistry</td>
<td>0.366</td>
<td>1</td>
<td>0.545</td>
</tr>
<tr>
<td>Orthodontics &amp; Dentofacial Orthopedics</td>
<td>0.121</td>
<td>1</td>
<td>0.728</td>
</tr>
<tr>
<td>Public Health Dentistry</td>
<td>0.121</td>
<td>1</td>
<td>0.728</td>
</tr>
</tbody>
</table>

P < .05 denotes statistically significant difference

99.6% correct identification of the PSB of Orthodontics & Dentofacial Orthopedics (Straightening of Teeth), and of Public Health Dentistry (Organized Dental Camp) whilst the PSB showing Dental Check Up/X-Ray scored a 99.2% correct identification of the Department of Oral Medicine & Radiology. This was closely followed by scores of 98.8% for the PSB’s of the departments of Prosthodontics and Crown & Bridge (False Teeth Sets/ Crowns) and of Paedodontics & Preventive Dentistry (Dental care for children). The least correct responses were observed for the PSB’s of the Department of Conservative Dentistry & Endodotnics (Tooth Filling) (86.2%) and the Department of Periodontology (Cleaning of Teeth) (85.8%).

**Questionnaire II**

The Likert scale scores obtained from the ratings of the PSB’s of individual departments are summarised in Table 4. The preponderance of opinions rate the PSB’s favourably with opinions of either strongly agree (47.3% -12.3%) or agree (52.3%-78.1%). The maximum agreement was observed for the PSB of the Dept. of Orthodontics & Dentofacial Orthopedics (Score 5 = 47.3%; Score 4=52.3%) followed by the PSB’s of the Depts. of Oral Medicine and Radiology, Oral & Maxillofacial Surgery, Paedodontics & Preventive Dentistry and Public Health Dentistry. However, there were those who disagreed and a score of less than 3 was obtained for the PSB’s of all departments except for the Dept. of Oral Medicine and Radiology and the Dept. of Oral & Maxillofacial Surgery. Least agreement was observed for the PSB’s of the Dept. of Conservative Dentistry & Endodontics and the Department of Periodontology with a few subjects awarding Score 2 (3.8% and 0.8% respectively) and Score 1 (3.5% and 0.4% respectively) for these two departments.

Table 6: Response rate, Chi-square- and p-values for Questions 9-11 of Questionnaire II

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
<th>Chi-square</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q9 Introduction of PSB signage is needed in dental hospital</td>
<td>Yes 258</td>
<td>3.278</td>
<td>0.070</td>
</tr>
<tr>
<td></td>
<td>No 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q10 Signage will help the patient to identify the department more easily</td>
<td>Yes 253</td>
<td>0.276</td>
<td>0.600</td>
</tr>
<tr>
<td></td>
<td>No 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q11 Signage is better than Names (Prosthodontics, Orthodontics) and No’s (1,2,3 etc.) for easy identification of the department by the patient</td>
<td>Yes 238</td>
<td>4.501</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td>No 22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table shows the response rate, Chi-square- and p-values for Questions 9-11 of Questionnaire II.
As the general population may not be fully aware of the dental specialties (and the treatment rendered by them); the subjects were pre-educated in Phase I to avoid confounding responses. It may be partly due to this preliminary phase that strong agreements were recorded for many departments, but it is clear that there is a definite association and a close correlation between the depiction by the PSB’s of the specialties and the treatment rendered by these departments. That association is demonstrated by:

a. The wire and brackets on teeth shown in the PSB of the Department of Orthodontics & Dentofacial Orthopedics clearly indicates the specific type of treatment offered by the Department.
b. The extracted tooth with forceps in the PSB of the Department of Oral & Maxillofacial Surgery illustrates an extraction procedure.
c. The picture of two school children going to a dental clinic suggests the treatment aspect of the Department of Paedodontics & Preventive Dentistry.
d. The PSB for the Department of Prosthodontics and Crown & Bridge shows an artificial complete denture (similar to false teeth) in the oral cavity.
e. The use of mouth mirror and a radiograph is a representation of the examination and diagnosis aspect of the Department of Oral Medicine & Radiology.
f. Finally to emphasize the role of community service by the Department of Public Health Dentistry, a group of people going to a camp were shown in the PSB.

The maximum disagreement was observed, in both the questionnaires, for the PSB’s of the Department of Periodontology (Score 2= 10; Score 1= 2) and the Department of Conservative Dentistry & Endodontics (Score 2= 9; Score 1= 1). This poor identification can be attributed to the following reasons:

a. The PSB of the Periodontology Department shows an ultrasonic scaler cleaning plaque and calculus. This picture may not have highlighted correctly the “gum treatment” as written on the patient information board displayed in the reception area and as explained to the subjects during Phase I for the study.
b. The PSB showing a scaler removing the calculus/plaque could have been confused as a dental instrument/tool removing decayed portions of the teeth.
c. The PSB of the Department of Conservative Dentistry & Endodontics shows the drilling procedure rather than the restoration and in this respect varied from what was explained to the subjects in Phase I.
d. As dentists are seen to be mainly associated with teeth cleaning and filling, the subjects would have expected a single department which was providing both treatments.

e. The wire and brackets on teeth shown in the PSB of the Department of Orthodontics & Dentofacial Orthopedics clearly indicates the specific type of treatment offered by the Department.

It is not an uncommon scenario in a multispeciality dental hospital to find patients looking for a particular specialty department (or specialists) standing just in front of the department they seek. This can occur irrespective of their socio-economic level or frequency of visits to the dental clinics. There may be two main reasons. Firstly, the formal names of the different dental specialties do not give any hint/clue to a layman regarding the kind of treatment rendered by a particular department. Secondly, names and numbers are more difficult to memorize and remember as compared with a PSB that can be much easily recognized and recalled. Thus these PSB’s, together with the display of name and number, could have an added beneficial effect to make department navigation and identification easy for the general public.

Further scope of the study lies in gauging the response of the patients/visitors to the introduction of PSB’s in a dental facility. Modifying and refining the PSB’s may render them widely acceptable.

**CONCLUSION**

It can be recommended that such Pictorial Sign Boards should be displayed along with the formal names and the allotted office numbers for the departments in a multispecialty dental clinical facility.

**Declaration:** No conflict of interest was declared.

**References**

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References:
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\textit{In vitro} studies have shown that the robust layer builds up over 5 days\textsuperscript{10} and, with twice-daily brushing, provides patients with continual protection from dentine hypersensitivity.\textsuperscript{13-15}


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SADJ March 2015, Vol 70 no 2 p72 - p74
S Ranchod1, A Jeftha2, M Meyer3, WP Dreyer4

CASE REPORT

A 19 year old female presented with spontaneous intra-oral bleeding of two days duration. The patient reported that she was, until recently, in good general health and also that she had an uncomplicated parturition three years ago. She recently started noticing blood in her stools and felt increasingly lethargic. There was no history of trauma or intra-oral intervention that may have initiated the bleeding.

The clinical examination revealed marked pallor of the facial skin and multiple small petechiae were seen on both of her forearms. The intra-oral examination identified marked halitosis and multiple haemorrhagic lesions with a variable appearance, being plaque-like on the lip, nodular on the tongue and fungating and exophytic on the palate and in the retromolar regions. Even delicate manipulation of the tissues produced profuse bleeding (Figures 1-3).

Due to her general weakness and the excessive bleeding she was admitted to the local tertiary hospital with the suspicion of thrombocytopenia and possible HIV infection. The reason for the latter suspicion was that some of the oral lesions clinically resembled Kaposi sarcoma. Upon admission, the following vital signs were recorded: blood pressure (BP) 97/52; heart rate 140 beats/min; temperature 36˚C; random blood glucose 8.7mmol/L; ward haemoglobin (Hb) 6.4g/dL; and weight 55kg. Venous blood was drawn and submitted for a full blood count, INR, direct Coombs test and test for HIV infection. There was a marked difference between the haemoglobin level taken in the ward and that from the blood test result with the latter being much lower. The results are tabulated in Table 1. The blood tests confirmed HIV infection and the suspicion of oral Kaposi sarcoma was thus vindicated. In consultation with the Department of Haematology of the hospital, Evans syndrome and idiopathic thrombocytopenia were added to the differential diagnosis.

The marked anaemia and thrombocytopenia on the day of admission necessitated immediate transfusion of leukocyte depleted packed red blood cells (LDPRBC) and platelets. This was done under the supervision of the attending haematologist and, on Day 1 post-admission, she received three units of LDPRBC and two mega-units of platelets. Blood tests subsequent to the transfusion revealed that her red cell count (2.92 x 1012/L), Hb (8.4 g/dL) and platelet count (2 x 109/L) remained low. On Day 2 she received a further two units of LDPRBC and one mega-unit of platelets which resulted in her reporting feeling better. At this time, her vital signs were noted as follows: BP 109/65, heart rate 94 and temperature 36.6˚C.

On day 3, under the guidance of the haematologist, intravenous infusion of a 3% solution of immune globulin (Polygam©) was commenced at a rate of 1g/kg body weight over 90 minutes. As a result of the high probability of side effects with the use of Polygam®, she was also prescribed a stat dose of 100 mg of solumedrol and 25mg phenergan, administered intravenously, as prophylaxis. She received two further doses of Polygam® on Days 4 and 5. A clinical examination on Day 6 revealed that there was no intraoral bleeding, no increase in the size of the petechiae and that the melena had resolved. A further two units of LDPRBC and a mega-unit of platelets were administered due to the blood results still indicating a low haemoglobin level (6.9 g/dL) and platelet count (3 x 109/L). The lesions, however, had regressed to such a
degree that the differential diagnosis of Kaposi sarcoma could then be excluded. Subsequent blood tests revealed that the direct Coombs test (direct antiglobulin test) was again positive (1+ strong micropositive), in the presence of thrombocytopenia (4 x 10⁹/L), thus the diagnosis of Evans syndrome.

Treatment for Evans syndrome was then initiated and included: azathioprine (150 mg per os daily for three days) and prednisone (60 mg per os daily). Her red cell count (3.48 x 10¹²/L) and haemoglobin (10.0 g/dL) had both improved but her platelet count remained low (7 x 10⁹/L). By Day 8 post-admission, the lesions had nearly totally regressed and her platelet count improved to 46 x 10⁹/L. She was subsequently discharged and prednisone was prescribed (60 mg/day for one month) and the one month follow-up examination revealed total regression of all lesions. Her red cell count (3.98 x 10¹²/L), haemoglobin (11.5 g/dL) and platelet count (108 x 10⁹/L) had all improved. The prednisone was continued for the next month at a dosage of 40 mg/day and, at that time, the patient’s pallor and lethargy had both dissipated and she reported feeling in good health. Her blood results were within the normal range (red cell count: 3.88 x 10¹²/L; haemoglobin: 11.2 g/dL; platelets: 210 x 10⁹/L). The prednisone dosage was then decreased to 35 mg/day, HAART was then commenced and at her follow up visit after a further two months, the patient had no oral or skin lesions and was otherwise stable. She is currently on a regular recall schedule and at the time of publication she remained stable without recurrence of the intra-oral haemorrhagic lesions (Figure 4).

DISCUSSION

Evans syndrome (ES) is an uncommon autoimmune disorder and is defined by the simultaneous or sequential development of autoimmune haemolytic anaemia (AIHA) and immune-induced thrombocytopenia (ITP), with a positive direct antiglobulin test (also known as the Coombs test), in the absence of known underlying aetiology. At times the condition may be accompanied by immune neutropenia.1,2 The condition was first described in 1951 by Robert Evans, based on a series of 24 patients who presented with a spectrum of these clinical features.1 ES is a rare condition and is diagnosed in only 0.8% to 3.7% of all patients presenting with either ITP or AIHA at onset.3 It is considered a diagnosis of exclusion and as it suggests an advanced state of immune dysregulation, other autoimmune conditions such as systemic lupus erythematosus (SLE),4 lymphoproliferative disorders,5,6 primary immunodeficiencies7, collagen vascular diseases and autoimmune lymphoproliferative syndrome (ALPS) should be excluded.8-11 In addition to the presence of ITP and AIHA seen in Evans syndrome, immunologically, there is a reversal in the CD4:CD8 ratio,3 (normally ≥1) which is an indicator of severe immune dysregulation. This occurs as a result of a decrease in CD4 cells (T helper cell) with a compensatory increase in CD8 cells (a class of T regulatory cells). The reversal also occurs in uncontrolled HIV infection, however, in the case presented above only the CD4 count was available on the day of admission so no information on this ratio was available.

Haematological abnormalities such as anaemia, thrombocytopenia and neutropenia are commonly observed in patients infected with HIV.12-14 Pancytopenias are frequent
complications of HIV and may be the result of a bone marrow production defect or due to increased peripheral loss or destruction of blood cells. These abnormalities may occur as a result of the HIV infection itself or as a result of HIV-associated infections or malignancies, and may also arise as a consequence of the therapy used for the HIV infection. Numerous studies have demonstrated that a positive Coomb’s test occurs in patients with HIV, up to an incidence rate of 21%, but frank haemolysis is infrequently reported in such cases. HIV-associated thrombocytopoiesis has also been reported based on the presence of antibodies directed against membrane proteins as well as adherence of immune complexes to platelets, however, ES is rarely associated with HIV infection with only a few cases having been reported. To the best of our knowledge, the case presented above is unique in the sense that ES was considered as second line therapy. In non-responsive cases, third-line therapy may include autologous or allogeneic stem cell transplantation but it does not have a reliable outcome, largely due to the relatively high mortality and failure rate in ES.

CONCLUSION

The significance of oral lesions as presenting features of HIV infection and as markers for the progression of immunosuppression is well documented. A unique case is presented above where the oral lesions associated with Evans syndrome lead to the diagnosis of a co-existing HIV infection. Normally, HIV-associated oral lesions present as opportunistic infectious lesions but, in this case, it presented as the oral lesions of a blood dyscrasia. Although other publications have reported on the co-existence of Evans Syndrome and HIV infection, as far as could be ascertained, the present case is the only one to date where Evans syndrome was the presenting condition. ES is a manifestation of severe immune dysregulation and in cases where immune-mediated destruction of blood cells are apparent, the presence of a co-existing or underlying HIV infection should be considered.

It thus begs the question: should Evans syndrome be added to the list of presenting conditions/lesions for HIV/AIDS? In view of the case presented here, it certainly seems to be appropriate.

Declaration: No conflict of interest was declared.

References

2. Evans RS, Duane RT. Acquired haemolytic anemia; the relation of erythrocyte antibody production to activity of the disease; the significance of thrombocytopenia and leukopenia. Blood 1949, 4: 1196-213.
The images represent features of Thalassemia which is a congenital, familial haemolytic anaemia, also named Cooley’s anaemia or Mediterranean anaemia. Three forms of the anaemia are recognised, the major, the intermediate and the minor type. Thalassemia major is genetically the homozygous type with both parents having the abnormal haemoglobin, whereas the thalassemia minor is genetically the heterozygous type. Symptoms are almost exclusively connected with the major type. The exact nature of the disease is unknown, although it is recognized that the red blood cells in thalassemia major have a shortened life span and also contain fetal haemoglobin. This would suggest a defect in some component of the factors controlling the rate synthesis of adult haemoglobin (Hb A). The onset of the severe form of the disease (thalassemia major) is within the first two years of life. Siblings are commonly affected. The child has a yellowish pallor of the skin and exhibits fever, chills, malaise and a generalized weakness. Thalassemia is common in Africans but also in Italians and Greeks. The thalassemia trait may confer a degree of protection against malaria, which confers a selective survival advantage on carriers. Enlargement of the maxilla in children is rich in red marrow. Since the erythrocytes are deficient, the production is high and the marrow becomes hyperplastic; this causes the overgrowth. There is bulging of the alveolar process, and overbite or open bite is often present (Figure A courtesy of Dr. M. Ulmansky, Jerusalem, Israel). A coarse trabecular pattern of the alveolar bone of the maxilla and mandible is very often encountered as well as thinning of inferior cortex of the mandible and steppladder arrangement of interdentally trabeculae resembling very fine lattice (Figure B). Enlargement of the jaws in a vertical dimension is also discernible. In later stages the calvarium presents the classic “hair on end appearance” This is a very striking appearance. The individual bony spicules may stand above the bone for a distance of over a centimetre; there are many and they may involve the whole or greater part of the vault of the skull (Figures C and D). Treatment of thalassemia is regular transfusion protocol. Recent studies recommend RBC transfusion when the Hgb level is less than 9.5g/dl. This therapy appears to be a reasonable compromise that is effective in reducing ineffective erythropoiesis and other pathophysiologic consequences of thalassemia.

Reference
1. Farman AG, Nortjé CJ & Wood R E: Oral and Maxillofacial Imaging, 1st Ed, Mosby, St. Louis, Missouri 1993 pp 151-152
SCENARIO
A middle-aged, partially edentulous Caucasian female patient presented to a general dentist for extraction of a mandibular tooth. The tooth was removed by the dentist, but following incomplete resolution of pain the patient returned three months later for a consultation. The dentist diagnosed an abscess following radiographic investigation and referred the patient to a specialist who diagnosed a fracture of the mandible. The fracture had occurred unbeknown to the dentist and was consequently treated by a reduction procedure. The patient has since pursued legal action against the dentist.

BACKGROUND
The extraction of teeth is a routine part of daily clinical dentistry, and while practitioners may choose to refer the patient to maxillofacial and oral surgeons, the removal of teeth remains a treatment modality that can be carried out by any general dentist. Removal of teeth requires the severing of periodontal tissues and its forceful dislodging from within the tooth socket. Periodontal disease, loss of clinical attachment and bone, existing infection and necrosis of the tooth socket may all contribute the tooth’s mobility, rendering it easier to remove. In some instances, extraction of a tooth requires extreme and considerable surgical intervention to ensure that it is entirely removed – roots and all.

Force applied to a tooth during extraction may be dissipated and transferred to the surrounding bone, to the temporomandibular joint, and throughout the masticatory apparatus. Isolating this applied force solely to the tooth and its immediate periodontal tissues may not always be possible. In addition, anatomical structures may negatively contribute to the strength of the jaw tissues, making them susceptible to injury or even fracture, to dislodging of the tooth and/or parts of it into neighboring anatomical spaces. The mandible exceeds the maxilla in terms of strength of cortical bone, but nevertheless has anatomically weak areas liable to damage and fracture. With the loss of posterior lower teeth, considerable mandibular resorption may occur. The bone flattens and thins posteriorly as the mylohyoid groove and submandibular fossa continue to the ramus – a point of anatomical weakness. The third molar is typically located at this posterior location within the angle of the mandible, may occupy a considerable volume within the bone and when removed may leave a defect that significantly weakens the jaw. The clinician should be aware of these anatomical idiosyncrasies, ensure that pre-operative investigations are carried out and that the patient has been duly informed of the risks and of possible complications prior to treatment.

Complications and mistakes are inevitable in the practice of dentistry and while in many instances are not permanently harmful, some certainly may be. Mistakes turn into negligence when it is confirmed by a reasonable body of expert opinion that they are harmful, that the harm was caused by the dentist in question and that the mistake did not conform to good professional conduct (i.e. was not the sort of mistake that is unavoidable in the circumstances). Negligence may be defined as a “failure to exercise reasonable skill and care” or the “omission to do something which a reasonable man guided by those considerations which ordinarily regulate conduct of human affairs, would do, or something which a prudent and reasonable man would not do”. Every qualified dentist is expected, by virtue of his or her qualification, to possess a degree of skill and to appreciate that care must be exercised to the same standard as by the majority of his/her colleagues. A general dentist is not expected to possess the skills of a specialist, but more importantly, should not attempt any treatment which should be provided by a specialist and any attempt to do so could be construed as a failure to exercise reasonable care. That said the general practitioner in this scenario was not practising outside of his or her scope per se.

In general, when a patient is accepted for treatment by a dentist it is an implicit, though unstated, condition of the contract thus established that reasonable skill and care will be exercised. Any patient can initiate legal action to recover damages by way of compensation against a practitioner on the grounds of negligence but for this to succeed it has to be proven that

(i) the dentist owed a ‘duty of care’ to that patient in the prevailing circumstances,
(ii) there was a breach of that duty and
(iii) damage was sustained as a result.

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ETHICAL CONSIDERATIONS

Respect for a patient’s autonomy is reflected by good communication. Rendering appropriate clinical care (beneficence) requires effective communication and failure to do so can result in harm to the patient (maleficence). This in turn can have legal consequences (justice). From an ethical perspective, the patient-centered approach used in health care is in keeping with the principle of respect for autonomy. Respecting patient autonomy requires dentists to be honest with their patients, but it is not always easy to disclose to a patient that something has gone wrong and in your efforts to improve their condition you have inadvertently caused them harm. Nor is it always possible to disclose to a patient every possible complication or adverse effect of a proposed treatment modality. Disclosure requires a strong moral character and while moral and legal principles may guide us through ethical dilemmas and identify basic standards for decision making, they do not define what makes someone a good dentist. Personal attributes of compassion, trustworthiness, integrity and discernment – sometimes referred to as moral ‘virtue’ - are of especial importance, together with the added virtues of courage balanced by the virtue of prudence. That said, even the good, moral dentist may encounter complications, and unfortunately - legal recourse.

Informed consent must be obtained prior to the delivering any treatment. It is the patient’s autonomous authorisation of the clinical intervention or treatment. Giving thorough information regarding the treatment is implicit and according to the National Health Act this is to include the:

- Range of diagnostic procedures and treatment options available
- Benefits, risks, costs and consequences associated with each option
- User’s right to refuse care after having received explanations of the implications, risks and obligations of such refusal
- Furthermore, this information must be provided in a language that the patient understands and in a manner that takes into account the patient’s literacy level.

To protect both patient and the clinician, these tenets are best provided in writing, and for the patient to autonomously sign agreement or disagreement against each item and to select the treatment after having had the time to consider alternative options, understanding the implications, risks and benefits of each option, as well as that of non-treatment. Obtaining such consent is an ethical and legal requirement and any coercion negates the voluntariness of the obtained consent. Clinicians aware that a certain operation carries a particular risk may inform that patient accordingly and obtain consent for the operation. The potential damage may still occur and the patient, despite the informed consent provided, may go on to sue the clinician for negligence. To succeed in such a claim the patient would need to prove that although aware of the risk, the clinician failed to exercise reasonable skill and care, either in the manner of his or her operating or even by attempting the operation him or herself instead of referring the patient to a more experienced colleague or a specialist. However, the clinician who attempts such an operation without informing the patient of the known risk places him or herself in a much worse situation and risk of subsequent legal action than when informed consent is obtained.

The following may be useful to prevent possible disagreements and miscommunication:

- Have educational material available to patients – pamphlets, booklets, electronically
- Invite your patient to pursue a second opinion if need be
- Keep concise records, written notes, radiographic imaging etc.
- Ensure explicit and informed consent and record it
- Be adequately prepared for complaints and legal challenges
- Ensure thorough follow-up after more advanced and complicated procedures
- Investigate and address unusual postoperative symptoms
- Consult regularly with specialists and consultants and refer if necessary
- Keep updated with best practice care by attending continued professional education courses

CONCLUDING REMARKS

The reasons for and risk factors following dental surgical complications may not be well known and understood by patients and therefore it is important that the time is taken to communicate these prior to any treatment proposed. In addition, supplementary patient information such as take home pamphlets may better protect and prepare both patient and clinician. Complications may occur at any time, even to the most experienced clinician and should be managed effectively and efficiently. Paramount is an expression of empathy and concern toward the patient. Effective two way communication may prevent the deterioration to a disagreement involving legal proceedings. If the clinician is aware that a mistake or complication has arisen, then it is prudent for the patient to be immediately informed and told what steps are going to be taken to rectify it.

References


See SADA Branch contact information next to the classifieds on page 88
The continued popularity of dental implants for prosthetic rehabilitation and the need for time and cost savings has led to a revision of numerous aspects of the original treatment protocols including the timing of implant loading. Immediate implant loading is defined as implant placement with primary stability and prosthetic loading with a provisional prosthetic tooth at the same clinical visit. There are several factors that need to be considered in this technique—these include primary implant stability, implant geometry and surface topography integration, surgical technique, bone quality and quantity, prosthesis design, and occlusal forces. Alfadda (2014) reported on a randomized controlled trial (RCT) that sought to determine whether four dental implants in the mandible can be loaded immediately, thereby providing successful implant-supported fixed prostheses and further, to evaluate implant success, clinical function, and prognosis of implant-supported fixed prostheses.

The null hypothesis was that there is no increase in the failure rates of prostheses and immediately loaded implants in comparison with implants placed with a delayed loading protocol.

Materials and Methods: This parallel group RCT comprised of 42 subjects (24 females and 18 males) who were randomly assigned to an experimental arm (EA), where patients underwent the immediate loading protocol, and a control arm (CA), where patients were treated using the standard delayed loading protocol.

A sealed numbered randomization envelope assigned to each patient was opened only when the implant-placement surgery had been completed in order to eliminate any possible operator bias during surgery.

Prior to implant surgery, each patient and each proposed prosthetic site was assessed by a prosthodontist. For inclusion, patients had to be edentulous adults. The teeth at the implant site had to have been extracted or lost at least 3 months prior to the date of implant placement and the bone quality and quantity was sufficient to allow placement of four TiUnite dental implants (NobelBiocare®), of at least 3.75 mm in diameter and 10 mm in length between the two mental foramina without the use of concurrent bone augmentation techniques. Patients were excluded on their basis of their health or poor oral hygiene status. Heavy smokers (>20/day) were also excluded.

The surgical protocol followed was standardized in both groups. A crestal incision in the mandible was made, extending about 1 cm beyond the mental foramina. Then, the mucoperiosteum was elevated and the implant site was prepared. Four TiUnite dental implants (NobelBiocare®) were placed between the mental foramina. Immediately following surgery, the initial stability of the implants was assessed by hand testing using a torque wrench (torque value ≥35 Ncm). Right after surgery, allocation to either arm of the study was determined using the randomization envelope.

In the EA with immediate loading, the existing mandibular denture was converted into an interim implant-supported fixed prosthesis. This was inserted the same day as implant-placement surgery. The occlusion was evaluated and refined when necessary. The fabrication of the permanent implant-supported prosthesis was initiated 2 weeks after surgery.

In the CA, healing abutments (NobelBiocare®) were placed on the four implants and the soft tissues were then sutured. The mandibular denture was hollowed out and relined with a soft tissue reline material and adjusted so that it was not resting on the healing abutments in order to prevent loading of the implants. The permanent implant-supported fixed prosthesis fabrication process was initiated 3 to 4 months post-surgery.
Day hospitals are ideal for young children, but there are more benefits for you to consider:

- **Affordable**: Reduced co-payments in day hospitals for patients on medical aids is R800 vs R1700. Patients not on medical aid can afford procedures more likely in a day hospital.
- **Convenience and Comfort**: Patients and family can plan their day – procedure time and duration is planned and confirmed. Recovery takes place in the comfort of your own home. No overnight stay.
- **Little ones**: Child friendly facilities which is less traumatic for children going for procedures.
- **Economical**: Fast admission and discharge times which suits patients and doctors.
- **Safe**: Reduced risk of infection

- **Atmosphere**: Friendly and specialised staff work shorter hours and give their best at all times.

Cure Day Clinics Holdings is a truly South African company with the vision to provide a national footprint of day hospitals to citizens in South Africa. Their model of cost effective day hospitals, which provides state-of-the-art equipped theatres to doctors, is proving to become a welcome solution to the South African medical market.

The international trend* of more elective surgery done in day hospitals is steadily becoming the choice of patients and doctors due to the convenience and cost savings.

Patients were assessed regularly and in a blinded fashion by a calibrated, independent investigator at 2, 6, and 12 months following completion of treatment.

During follow-up visits, prosthesis and implant success was evaluated by torquing the implants with a standardized torque wrench set at 20 Ncm. If an implant was shown to be mobile or painful while torquing, it was considered a failure and removed.

Standardized long-cone intraoral periapical radiographs were used to assess peri-implants bone levels. These radiographs were taken at the insertion of the permanent mandibular implant-supported fixed prosthesis stage (baseline) and during the 12-month recall visit.

The measurement of bone level was performed by a blinded calibrated investigator. The mean of two measurements for each site was utilized for statistical analysis of changes in crestal bone level.

RESULTS
Of the 42 patients, one was excluded from the study and 4 patients from the EA were transferred to the CA of the study. Of the 42 patients, one was excluded from the study and 4 patients from the EA were transferred to the CA of the study. The mean (±SD) age of the patients was 61.5 ± 10.35 years. Twenty-four (57.5%) of the participants were female and 18 (42.5%) were male. Demographic data of the patients in both study arms did not differ significantly. Overall, one hundred sixty implants were placed between the mental foramina; one hundred thirty-five were 3.75-mm-wide implants, one was 3.3mm wide, and the remaining 24 implants were 4 mm in diameter. Implant length ranged between 10 and 15 mm, with the majority being 15 mm (75.6%). No statistically significant difference was found between the two arms in terms of implant diameter distribution (p = .103). The implant success rate was comparable between the two arms and exceeded 96%.

Bone loss analysis for the two arms of the study showed that there was statistically significantly more bone loss during the first year of loading in the immediate loading arm (mean −0.296) as compared with the conventional loading one (mean −0.037).

CONCLUSIONS
The prosthetic survival rate 1 year post-loading in the immediate and the control loading arms was the same (100%). No statistically significant difference in implant success rate (96%) was observed between the two study arms.

IMPLICATIONS FOR PRACTICE
The high clinical success rate in this randomized controlled clinical trial contributes to a growing body of evidence that supports the use of immediate loading protocols for dental implants using mandibular implant-supported fixed prostheses. This treatment modality should reduce treatment time, cost, and surgical morbidity significantly.

Reference

2. Can a shortened dental arch result in TMJ pain?

ACF Elias, A Sheiham1

Recent clinical studies have found that oral and systemic health and indeed quality of life or patient’s satisfaction do not specifically depend on the presence of a full complement of Teeth.1 It has been observed that a large proportion of middle-aged and elderly patients are satisfied with their oral function even after molar loss and that the retention of solely the anterior and premolar teeth may be sufficient to satisfy the aesthetic and functional requirements of the majority of elderly patients. Several studies have been performed to investigate whether missing posterior teeth, a situation named shortened dental arch (SDA) can cause or is related to Temporomandibular disorders (TMD), which comprises a heterogeneous group of conditions affecting the temporomandibular joint (TMJ), the masticatory muscles, and/or surrounding tissues.2 There have been contradictory findings on the relationship between SDA and TMD and the quality of published studies is poor.

Treatments of SDA comprise the replacement of missing teeth by removable dental prostheses (RDP), cantilever or implant-supported fixed dental prostheses (FDP), or the preservation/restoration of the premolar occlusion. The randomized shortened dental arch study (RaSDA) as reported by Reissmann and colleagues (2014)2 aimed to provide information on a variety of outcomes for two treatment options in patients with missing posterior teeth, retaining or preservation of an SDA and replacement of missing posterior teeth by RDPs, with tooth loss as the primary outcome. The aim of this analysis was to assess the impact of missing posterior support on the risk for TMD pain.

MATERIALS AND METHODS
This was a multi-centre, RCT using consecutively recruited patients in 14 prosthodontic departments of dental schools in Germany. For inclusion in the study, patients had to request prosthodontic treatment and have all molars missing in one jaw, with at least both canines and one premolar present on each side of the jaw. Patients with acute signs or symptoms of TMD or a Grade 2 or higher of the Anamnestic Helkimo Index were excluded. A total of 152 patients received allocated interventions and were analyzed. Data were collected before treatment and at follow-ups after treatment
were female (53.9%) with no significant differences between
package STATA. intention-to-treat analyses using the statistical software
bruxism as covariates. All analyses were performed as
ses were controlled for gender, sleep bruxism, and awake
were applied for characteristic pain intensity, and analy-
Logistic regression analyses were applied for self-reported
assessed using the mean of the pain intensity items (cur-
range from 0 (no pain) to 10 (pain as bad as could be).
characteristic pain intensity was
sign of pain occurred in any of the examined regions on
movements (mouth opening or closing) in both sides. TMD
was performed in the posterior region. In cases with missing
second premolars, cantilever fixed dental prostheses (FDP)
were incorporated to replace the missing tooth.
In the RDP groups, molars were replaced. Tooth
replacement was carried out by means of RDPs retained
with precision attachments, connected to either splinted
crowns or FDP abutments on the posterior-most teeth on
both sides. If the second premolar was missing, it was
replaced by the RDPs as well.
Any missing tooth up to the second premolar was replaced
by conventional tooth-supported FDP in both groups. All
patients received appropriate dental pretreatment, in-
cluding oral hygiene instructions, periodontal treatments,
and endodontic treatment, if necessary, to ensure ad-
quate conditions prior to the final prosthetodontic treat-
ment phase. In cases with missing teeth in the opposite
jaw, teeth were replaced up to the second premolar in the
SDA group, and up to the first molar in the RDP group, to
ensure adequate occlusion and posterior tooth support.
All dental procedures were performed standardized in all
participating study centers.
The outcome TMD pain was assessed using patient self-
reports and was verified by clinical signs of pain in the
physical examination consisting of bilateral palpation of
the masticatory muscles (Temporalsis and Masseter) and
the lateral pole of the TMJ, and pain in the TMJ during jaw
movements (mouth opening or closing) in both sides. TMD
pain was considered clinically verified when at least one
sign of pain occurred in any of the examined regions on
either side. Additionally, characteristic pain intensity was
assessed using the mean of the pain intensity items (cur-
rent pain, worst pain, average pain in the last 6 months).
Possible scores of characteristic pain intensity could
range from 0 (no pain) to 10 (pain as bad as could be).
Logistic regression analyses were applied for self-reported
and clinically verified TMD pain, linear regression analyses
were applied for characteristic pain intensity, and analy-
ses were controlled for gender, sleep bruxism, and awake
bruxism as covariates. All analyses were performed as
intention-to-treat analyses using the statistical software
package STATA.
RESULTS
152 patients were included in the trial (71 in the SDA
group; 81 in the RDP group). At baseline, mean age of the
participants was 59.7 years and about half of the participants
were female (53.9%) with no significant differences between
intervention groups. About two-thirds (70.8%) were married
and lived with their spouse. Participants in the SDA group
were more often divorced (18.5% vs. 2.5%) and less often
lived with their spouse (63.1% vs. 77.2%) than those in the
RDP group. No significant group differences occurred for
level of education, professional activities, or alcohol and
tobacco use.
There were no significant group differences in oral para-
functions or physical health conditions. There were also
no significant differences between groups with respect to
both psychosocial measures.
Prevalence of self-reported TMD at follow-ups ranged
from 11.7% (48 months) to 18.1%. More than a third
(36.2%) of the participants reported having TMD pain on
at least one follow-up. TMD pain was clinically verified in
3.3% (48 months) to 5.4% (36 months) of the participants,
with a prevalence of 12% of clinically verified TMD pain at
any follow-up. Characteristic pain intensity ranged from 0
to 10 with means between 0.33 (48 months) and 0.43 (4–8
weeks). The overall mean pain intensity for the complete
study period was 0.39
Tooth replacement (RDP group) did not change the risk
for self-reported TMD pain significantly compared to no
tooth replacement (SDA group). Mean characteristic pain
intensity was virtually identical in both groups.
When analyzing the effect of tooth replacement on
TMD pain at each follow-up separately, only one of the
regression analyses revealed a statistically significant
effect. Odds Ratios for the effect of tooth replacement
(RDP group) on self-reported TMD pain were all around',
indicating no effect. While at 6 months after treatment the
prevalence of self-reported TMD pain was higher in the
RDP group (20.5 % vs. 14.9 %), at 36 months, prevalence
was higher in the SDA group (21.3 % vs. 13.9 %). Results
were similar for clinically verified TMD pain. Differences in
mean characteristic pain intensity between SDA and RDP
group were close to 0, expect for the 6- and 60-month
follow-up with small effect sizes. While pain intensity at
6 months was higher in the RDP group (0.48 vs. 0.21),
results were contrary at 60 months with higher values in
the SDA group (0.62 vs. 0.21), with a statistically significant
difference in the adjusted analysis. However, the absolute
value of the difference was still low. All three analyzed
outcomes indicated no effect by the time between
treatment and follow-up on risk for TMD pain.
CONCLUSION
The researchers concluded that retaining or preservation
of an SDA is not a major risk factor for TMD pain over the
course of 5 years when compared to molar replacement
with RPDs.
IMPLICATIONS FOR PRACTICE
These results suggest that missing molars do not have to
be replaced in order to prevent TMD pain.
Reference
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with mouth and number and position of teeth. J Oral Rehabil.
shortened dental arch study: temporomandibular disorder
The fascination of Dentistry... the finesse of Dentistry... the finances of Dentistry... the fellowship of Dentistry... the future of Dentistry.

YES, the focus was on Dentistry over three invigorating, inspiring and innovative days at the 2015 SADA Congress in Durban.

As we dispersed on Sunday afternoon there was a palpable sense of ambience admixed with a certain melancholy... It was the time to say farewell to colleagues old and new who had shared experiences, compared notes and debated the merits of the programme... and partied together! And the programme was indeed a considerable mix, with an intriguing 45 minute tour of World Finances laying out the challenges we face as practitioners, yes, but also as players in this complex international society. From thence a rapid change in direction to the intricacies of the smile, the aesthetics of crown design, and the latest application of advanced technologies in lasers and in digital design to facilitate precision in restorations. The enticing promise of harnessing stem cells in dentistry was explored... and cautious advances are being made... but it seems there are considerable intricacies yet to be unravelled. Then back to the everyday challenges of making practice in Dentistry work... what are the key features in achieving day to day success and satisfaction in the business of our profession? The need to think out of the box!

A sombre note emerged when the latest statistics and reports on legal problems in dentistry appeared on the screen... there is a need for indemnity cover today! But then the energy of the Dance brought the Congress to a close... the rhythms of The Lion King and the enjoyment of movement to music eloquently expressed.

And that was only the main plenary sessions... for we had the opportunity to attend a Traders Programme, there were parallel sessions in an innovative new feature, The Learning Centre Programme, including SciVision and Sirona, which offered small groups the chance for instruction in practical applications of lasers, CEREC, advanced radiology together with discussions on eminently practical aspects of Dentistry such as Dental Insurance and Management of Optimal Revenue Management.

Do not forget the wonderful dinner, The Gala Dinner... a moving address on The Gift of the Giver... an absolutely amazing organisation started by a Medical Practitioner after an epiphany he experienced in Turkey. Awards were made to outstanding members for their varied achievements... and long were the celebrations!

Durban Congress also saw the introduction of a computerised system of immediate gauging of audience reaction and opinion... that data will be collated and will be of enormous help in guiding planning for future Congresses.

Sad to depart... glad to have been there!
GENERAL

A comparison of the efficacy of various disinfection protocols in endodontic treatment: an in vitro study. (p 60)

1. Photo-activated disinfection relies on the release of highly reactive molecules of:
   a. hydrogen
   b. hydrogen peroxide
   c. oxygen
   d. chlorine

2. In Endodontics chemo-mechanical root canal preparation is essential to ensure
   a. removal of organic and inorganic material
   b. remove ridges and excrescences from the canal
   c. ensure no pulp stones remain
   d. access to the apical region of the canal

3. This study found that 3% NaOCl was not the most effective endodontic irrigant
   a. True
   b. False

4. However a combination of 3% NaOCl and 2% chlorhexidine gluconate was shown to be the most effective disinfective irrigant
   a. True
   b. False

Effectiveness of pictorial sign boards for patient navigation in multidisciplinary Dental Facilities. (p 65)

5. The Pictorial Sign Board (PSB) depicting Orthodontics was the PSB most frequently correctly identified by the test observers.
   a. True
   b. False

6. The consensus of opinion regarding the introduction of PSB’s in dental facilities is:
   a. PSB’s should be used alone with no other direction indicators
   b. PSB’s should be used in conjunction with office numbers and names
   c. Office numbers and names should remain the best option
   d. PSB’s should only appear at the entrance to the facility

Congenital granular cell tumour: an unusual antenatal presentation with a 12-year follow-up. (p 50)

7. The congenital granular-cell tumour (CGCT):
   a. Presents in affected families when close intermarriage occurs
   b. Has no known familial patterns of inheritance
   c. Presents as a familial inherited tumour
   d. Smooth muscle cells
   e. Gingival stromal cells

Radiopacities in soft tissue on dental radiographs: diagnostic considerations (p 53)

9. CGCT has been shown to be composed of
   a. Odontogenic cells
   b. Osteoblastic cells
   c. Smooth muscle cells
   d. Gingival stromal cells

10. A symptomatic ossified stylomandibular ligament is referred to as Eagle syndrome
    a. True
    b. False

11. Dystrophic calcification is the result of:
    a. soft tissue damage with tissue degeneration and necrosis which attracts the precipitation of calcium salts.
    b. Hyperparathyroidism
    c. Excessive intake of calcium containing foods
    d. Inadequate kidney function

12. Tonsilloliths:
    a. develop due to chronic inflammation of the tonsils.
    b. If large, they protrude from the tonsillar crypts
    c. manifest clinically as yellow or white stones.
    d. all of the above

Oral Medicine Case 67: Oral manifestations of Evans syndrome (p 72)

13. Both AIHA and ITP are seen in cases of Evans syndrome.
    a. True
    b. False

14. A positive Coomb’s test is also required for the diagnosis of Evans syndrome
    a. True
    b. False

15. ES is rarely associated with HIV infection, a.
    a. True
    b. False

Maxillo-Facial Radiology Case 128 (p 75)

16. The onset of thalassemia is during puberty.
    a. True
    b. False
17. Enlargement of the maxilla is the most noticeable feature of the oral structures?
   a. True
   b. False

Clinical Windows (p 78)

18. In the Alfadda trial, the existing mandibular denture was converted into an interim implant-supported fixed prosthesis in both groups.
   a. True
   b. False

19. In the Alfadda trial, both the Implant success rate AND implant survival rate was 96%.
   a. True
   b. False

20. In the SDA trial, the results suggest no association between a SDA and TMD pain.
   a. True
   b. False

21. According to the National Health Act of No 61 of 2003, Chapter 2 Section 6 the following information must be given to the patient (User of health care service):
   a. Range of diagnostic procedures and treatment options available
   b. Benefits, risks, costs and consequences associated with each option
   c. User’s right to refuse care and explain implications, risks and obligations of such refusal
   d. This information must be provided in a language that the patient understands and in a manner that takes into account the patient’s literacy level.
   e. All of the above

22. From an ethical perspective, the patient-centred approach used in health care is in keeping with:
   a. The principle of respect for autonomy.
   b. Dentists being honest with their patients at all times
   c. Dentists not deceiving patients
   d. Telling the truth
   e. All of the above

23. Good communication skills are not a prerequisite for responsible decision-making.
   a. True
   b. False

24. Informed consent must be obtained prior to the delivering any treatment.
   a. True
   b. False

25. Successful grounds for negligence must be able to show that:
   a. The dentist owed a ‘duty of care’ to that patient in the prevailing circumstances
   b. There was a breach of ‘duty of care’
   c. Damage was sustained as a result
   d. All of the above

Readers will note that we have reduced the number of General Questions to twenty whilst retaining five Ethics based questions. Our allocation of CPD points remains unchanged. There is optimism that this section will continue to provide members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure Continuing Education.

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