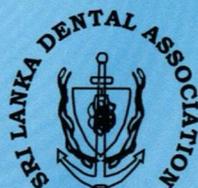




# Sri Lanka Dental Journal

**Volume : 41**  
**Number : 03**  
**December : 2011**



**The Official Publication  
of the Sri Lanka Dental Association**

**ISSN 1391-07280**



## **HI-TECH DENTAL LABORATORY**

The Pioneer Commercial Porcelain Laboratory

For all your Dental Laboratory Work :

- ◆ Porcelain crown & bridge work
- ◆ Orthodontics/ lingual arch bar, trans palatal arch
- ◆ Removable Orthodontic appliances
- ◆ Post crowns & Jacket crowns
- ◆ Metal Crowns in precious metal, semi precious metal
- ◆ Bridge work
- ◆ Maryland Bridges
- ◆ Chrome cobalt full and partial dentures
- ◆ Overdenture abutments for Dental Implants

*Sole Agent :*

### **INNOVA CORP - CANADA**

The endopore dental implant system endopore

**T.P. ORTHODONTICS**

**IMTEC MINI DENTAL IMPLANTS**

FOR DETAILS & PRICE LIST

## **DENTAL SERVICES CO. (PRIVATE) LTD.,**

No. 141, Vauxhall Street,  
Colombo - 2

Telephone : 2335175 , 2304185  
Fax No : 2304186



# Sri Lanka Dental Journal

Volume 41

Number 03

December 2011

The Sri Lanka Dental Journal is a refereed journal published three times a year by the Sri Lanka Dental Association in collaboration with the College of Dentistry and Stomatology of Sri Lanka, College of General Dental Practitioners of Sri Lanka and the College of Community Dentistry of Sri Lanka.

## Editorial Office

Office of the SLDA,  
Professional Centre,  
275/75, Bauddhaloka Mawatha,  
Colombo - 7.

Correspondence regarding editorial matters, articles, reviews and news items should be addressed to the Editor, SLDJ, Dr. Upul B. Dissanayake, Dept. of Oral Pathology, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka.

Tele: 0812 385821/0812 387500/0812 2392068  
0777 393318

Correspondence regarding advertisements and financial matters should be addressed to Dr. Malcolm Stanislaus, 50, Hekitta Cross Road, Hendala, Wattala.

Tele: 011 - 2930368

ISSN 1391 - 07280

© SRI LANKA DENTAL ASSOCIATION

Typeset & Printed by:

AK 2 PRO - Udahamulla, Nugegoda.

Tel/Fax: 011 - 2836190

## CONTENTS

### Editorial

- 37 Do Quacks Still Bite on Patients in Sri Lanka?  
*Upul B. Dissanayake*

### Featured Article

- 39 Measurement of orofacial pain: a broader perspective  
*Ranjith Pallegama*

### Research Articles

- 46 Unqualified dental practitioners or quacks in Sri Lanka  
*Dileep De Silva and N.T. Gamage*
- 52 Review of clinical performance of resin-bonded bridges over a five year period  
*M.C.N. Fonseka, U.U.K.P.C. Perera, K.A. Wettasinghe*

### Case Report

- 60 Solitary fibrous tumour of the oral mucosa: A rare tumour with unpredictable behaviour  
*P.R. Jayasooriya, P.R.C.L. Karunathilaka, R.M.A.S. Rathnayaka, R.M.P. Ratnayaka*

- 67 **Instructions to Authors**



# Sri Lanka Dental Journal

**Volume 41**

**Number 03**

**December 2011**

**Editor**

Upul B. Dissanayake

**Assistant Editors**

Udaya Usgodarachchi

Dilum Perera

Hilary Cooray

Ruwan Jayasinghe

**Finance Manager**

Malcolm Stanislaus

**Editorial Board**

N.A.de S. Amaratunga

R.L. Wijeyeweera

M.S.Chandrasekara

Lilani Ekanayaka

Ajith W.Ranasinghe

Deepthi Nanayakkara

M.A.M. Sitheequ

**International Advisers**

K.A.A.S. Warnakulasooriya (United Kingdom)

L.P.Samaranayaka (Hongkong)

D.Y.D. Samarawickrama (United Kingdom)

Micheal Mars (United Kingdom)

David Davis (United Kingdom)

Brian Millar (United Kingdom)

**Statistical Adviser**

Ranjith W. Pallegama

## EDITORIAL

### Do Quacks Still Bite on Patients in Sri Lanka?

The research article titled “Unqualified Dental Practitioners or Quacks in Sri Lanka” published in this issue has reported that there are 97 unqualified dental practitioners or quacks practicing in the country. Further, it has been highlighted that there is an increase in quacks by 9% from 2007 to 2012. As there is an upward trend in the percentage of quacks statistically, someone could say that this will increase further in the future. If so, there is no reasonable argument to refute it. The scenario may be worse with reference to the medical profession and may be we have seen only the tip of the ice berg.

In Sri Lanka, to practice as a dental or medical practitioner, he or she should register with the Sri Lanka Medical Council under the medical ordinance (Act No 26 of 1997).

No one has the right to jeopardize the health or in other words play with the lives of innocent people. Often, these unqualified practitioners cause more harm than good and in some instances, do irreparable damage to the patient. It is the prime responsibility of the government and health authorities to assure and deliver the best quality health care service to the citizens of this country. The government and law enforcing authorities should take stern action against this grave injustice to the public due to quackery. Law should be amended or reformed if inadequate, to eradicate this menace. Professional organizations both in the medical and dental profession must come forward and raise their voice against unqualified

practitioners and bring this to the notice of the respective authorities. Furthermore, professional organizations should also take steps to educate the public on this issue in order to rescue them from this danger before it becomes rampant.

**Upul B. Dissanayake**

## **Measurement of orofacial pain: a broader perspective**

**Ranjith Pallegama**

### **Introduction**

Pain is one of the most common complaints received from patients in clinical practice. With better understanding of the afflicting nature of pain and its wide variety of complications, a huge global effort is currently underway on education of pain management in order to diminish its impact on patients' lives and the national economies. A huge boost up is observed in pain research worldwide. The impact factor of journals that publish pain research has also remarkably gone up. Conferences and symposia are frequently organized at international level and timely issues and novel research finding are profoundly discussed with the aim of developing appropriate policies. In parallel with global developments, similar trend has been observed among Sri Lankan health professionals as well. Establishment of specialized pain clinics and attempts in establishing pain services at various institutions are the evidences for this. Within the last two years, like-minded health professionals, who are enthusiastic on pain management, gathered to establish several organizations (eg: Sri Lanka Association for the Study of Pain, Faculty of Pain Medicine in the College of Anesthesiologists of Sri Lanka) with the aims of facilitating education and research in pain and making an awareness on current trends in pain management. The feedback received from the participants who attended to the series of pain education workshops conducted island wide revealed the enormous need for updating

knowledge among primary healthcare workers in Sri Lanka.

Comprehensive assessment is a fundamental requirement in proper patient care. Pain is indeed now considered the "fifth vital sign" and which is recommended to assess in all types of patients. The intension of the present paper is to increase the awareness on measurement of pain, which is the first and the most crucial step in assessment of patients leading to appropriate management.

### **Nature of pain experience**

Pain is a complex emotional experience to the patient and it is not a simple physical sensation that arises from nociception. (Nociception alone is not a conscious process and engages sensory, emotional, and cognitive processing areas of the brain.) Pain in the orofacial region is very distressing and it drastically disturbs the important functions of the patient such as eating, speaking and facial expressions. Persistent orofacial pain conditions may lead to significant behavioral problems such as overly sedentary life, avoidance of regular social activities, dependence, anxiety and depression. Pain, especially when it is chronic, is considered as a condition in its own right and should be managed adequately to ensure the quality of life.

Stimulation and activation of nociceptors, which are free nerve endings, and consequent transmission of nerve impulses along the

nociceptive pathways to the brain is called nociception.<sup>1</sup> Nociception may or may not give rise to pain, and similarly, pain may be experienced with or without nociception. Pain has been defined by the *International Association for the Study of Pain (IASP)* as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.”<sup>2</sup> This widely accepted definition itself indicates that pain is not always associated with an actual stimulus or tissue damage.

### **Need for pain measurements**

Pain is always subjective, unique individual experience, and it lacks reliable objective evidence. Multitude of factors contribute to the variability in pain expression. Different pain thresholds are reported among different individuals and this could be due to individual variations in nociceptive mechanisms.<sup>3</sup> If pain is induced, using a stimulus of known strength, different individuals may perceive it, in different magnitudes and express different pain ratings. In addition there may be temporal variations in perception of pain within the same individual too. The variability in pain expression has often been attributed to variations in biological conditions, psychological status, socio-cultural background (early socialization and upbringing, gender roles) and personality factors.<sup>3</sup> For an example, a child grown up in one community may tolerate more pain compared to another child who was brought up in a different socio-cultural background. Further, evidence of genetic variations in pain expression and existence of ‘pain genes’ have also been reported.<sup>3</sup> Limited ability of patients in maintaining an accurate memory of painful events also contributes to the variability of pain expression. Our own research findings also corroborate with previous suggestions that pain memory is masked by existing pain conditions and certain psychological constructs such as catastrophizing.<sup>4</sup>

In clinical practice, the most reliable indicator for existence of pain, its sensory qualities, and impact on the quality of life is the patient’s description.

The clinician has to rely on the description of the patient even in the absence of objective evidence of pathology. Therefore, measurement of pain and recording intensity and other attributes at each visit of the patient will be helpful in determining management strategies, monitoring the effectiveness of the interventions, communicating among health care providers and collecting information for pain research in addition to future reference.

### **Measurement of pain**

Unidimensional measurements of pain (intensity and other sensory qualities of pain); Unidimensional measurements of pain provide substantial information about the pain experience of an individual. However, pain is a complex subjective experience which consists of intense affective, cognitive, behavioral and sensory components. It is often difficult for a patient to assign a number on a scale for such a complex feeling they experience. Further, if it is to be a comprehensive assessment, cognitive and emotional aspects should also be included in pain measurement.<sup>4</sup> Having identified this, Melzack and Torgerson (1971) first focused the attention of health professions on this multidimensional nature of pain experience and described its sensory-discriminative, motivational-affective and cognitively-evaluative dimensions.<sup>5</sup> It is now understood that the nociception is overlaid by all these factors and eventual summation is felt as pain.<sup>3</sup>

Pain reduces the quality of life of a person remarkably. It is found to disable an individual with a huge impact on their daily life by limiting movements, disturbing the ability of enjoying food, working and involving in social activities. In chronic pain conditions these limitations often translate to considerable socioeconomic constraints as well.<sup>6</sup> Therefore, multi-dimensional pain measurements will be essential for appropriate management of patients and will help clinician in exposing the patient to positive behaviors and thoughts which will facilitate recovery.

In addition to above two approaches, pain mapping will be a useful approach that will provide a comprehensive understanding on the distribution of pain and related attributes.

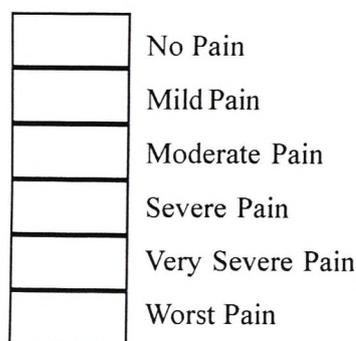
**Unidimensional measurements of pain**

Owing to the complex nature of the pain experience, it is important to realize that pain is not an attribute that can reliably be measured using an equal interval scale in the way the height or weight of a person is measured. The devices used in quantifying pain in one dimension include self-rating scales such as verbal (descriptive) scales, numerical rating scales, visual analogue scales and graphical (pictorial) scales. Inherent limitations are there in each of these tools. Accuracy and precision in pain scaling depend on adequate instructions given to the patient and extent of motivation of the patient thereby eliminating all the possible biases.

**Measuring intensity of pain**

**Verbal (descriptive) scales**

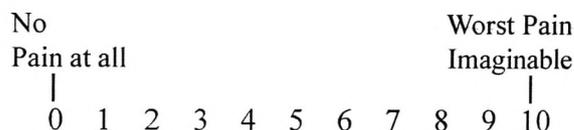
In verbal (descriptive) scales, the patient is asked to select the best response out of given descriptors either verbally or visually, that represents the pain intensity.<sup>7</sup> This is an easily understood simple tool and functions as a Likert scale (Fig 1).



**Figure 1.** A verbal scale with standard descriptors

**Numerical rating scales (NRS)**

NRSs are the most commonly used pain rating tools. Among them, 11-point NRS has been identified as the most valid and useful NRS. This 11-point scale extends from 0-10, in which “0” denotes “no pain” and “10” denotes “the worst imaginable pain” (Fig 2).

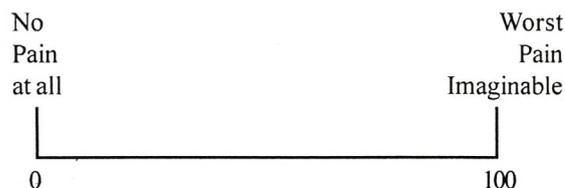


**Figure 2.** A numerical scale

Verbal scales and NRSs may not be appropriate to measure the pain repeatedly in the same person. Because patients may easily have a previous memory on pictures, numbers or words that they used before. However, NRSs are found to perform better than the descriptive scales for many purposes.<sup>7</sup>

**Visual analogue scales (VAS)**

In given VAS, a 100 mm horizontal line is used with two *anchor words* at the ends as descriptors: “No pain” and “Worst pain imaginable” (Fig 3). The patient is asked to show or preferably draw a line across the 100 mm scale at the point that best corresponds with the existing pain intensity. The VAS has been identified as the most reliable and widely used tool in research to quantify the intensity of pain. The measurements produced by VAS possess ratio/continuous scale properties and permits the usage of ratings in advanced analyses in research.<sup>8-11</sup>

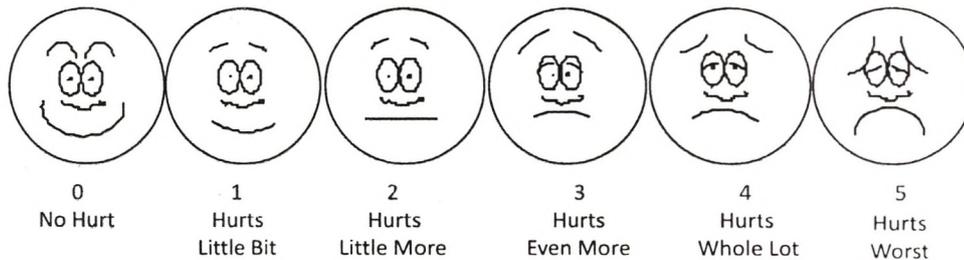


**Figure 3.** A visual analogue scale

**Pictorial (Graphical) scales**

Pictorial scales are commonly used in measuring pain in children (Fig 4). Measurements obtained from pictorial scales show a close linear relationship with the readings of the VAS.<sup>1,12</sup> Though various pictorial scales are available, the scale given in Fig 4 is sufficient for any general unidimensional assessment of pain in children who are not mature enough to use VASs or NRSs (Fig 4).

However, VASs and NRSs can also be used to assess any of these pain qualities separately. It will be wise to measure and record those qualities of pain that are more troublesome to a particular patient so that these records may be useful in management of the patients in subsequent visits, or in referring or in pain studies.



**Figure 4.** A pictorial scale for assessing pain intensity experienced by children.

**Measuring other sensory qualities in unidimensional pain assessment**

Aforementioned scales are devised to measure the intensity of pain. Although the more attention is paid on the intensity of pain, other sensory qualities of pain are also there to be assessed, especially when these qualities of pain make the patients to suffer more than intensity of pain. There are occasions where such qualities of pain make the patients to suffer more than the intensity of pain. Sharpness, burning sensation, dullness, coldness, tenderness, itchiness, annihilating nature, numbness, lightning or sparkling nature, tingling sensation, squeezing sensation or tightness, spreading nature, throbbing sensation, aching sensation, unpleasantness, deepness and rate of recurrence (time related qualities) are the other qualities of pain. These qualities of pain can also be assessed unidimensionally. Pain Quality Assessment Scale (PQAS) developed by Galer *et al*, in 2003 is a comprehensive tool that can be used to assess all the qualities of pain, but this assessment scale is not freely available to use.<sup>13</sup>

**Multidimensional assessment of pain**

Explaining the multidimensional nature of pain experience, Melzack and Torgerson described three major psychological dimensions, *viz.* sensory-discriminative, motivational-affective and cognitively-evaluative.<sup>5,14</sup> Some patients who suffer from pain with obvious pathology may have considerable psychosocial modulations such as attention seeking, anticipation, mood changes, higher anxiety and catastrophizing. Psychological reactions to chronic pain conditions such as frustration, and eventual development of more serious conditions such as depression is also possible in some patients.<sup>3</sup> A small percentage of patients who suffer from chronic pains could have a psychological origin (psychogenic pain) for the condition.

A complete assessment of pain should also include assessment of mood (especially anxiety and depression), interference in daily activities due to pain (disability), pain behaviors (limping, etc.), cognition and beliefs (e.g., locus of control,

acceptance of pain, catastrophizing, belief about the link between pain and injury) and use of pain coping strategies (avoidance, taking drugs, resting etc.).<sup>1,3,4,12</sup> There are specific tools available for assessment of many of these aspects, but with inherent limitations. Pain intensity, distress and interferences to the function are the most important dimensions that should be included in multidimensional pain scaling.<sup>4</sup> If the assessment of these three dimensions are not feasible due to the factors which are beyond control of the clinician, eg: unavailability of the validated tools in the respective local language, they should be at least assessed uni-dimensionally using VAS or NRS. This information will be helpful in getting an insight to the suffering nature of the patient and to assess the effectiveness of intervention.

A detailed assessment of psychological status which is named as “case formulation” will provide a rational basis for the appropriate multidisciplinary approach to the management of pain.<sup>3</sup> In the ‘*case formulation*’, the assessment goes beyond the diagnosis and all other contributory factors are identified. These identified contributory factors are the targets for intervention in the management process. For example, one patient with trigeminal neuralgia should be discriminated from another trigeminal neuralgia patient with a higher degree of catastrophizing. Such patients should be managed using appropriate multidisciplinary strategies.

McGill Pain Questionnaire, Short-Form McGill Pain Questionnaire and Brief Pain Inventory are among the commonly used tools in multidimensional assessment of pain patients. Unfortunately, none of these tools are available in local languages. Therefore, for a comprehensive assessment of patients, it is important to get at least a few of these general tools translated and validated to local languages.

### **McGill pain questionnaire (MPQ)**

The McGill Pain Questionnaire was developed by Melzack and Torgerson of McGill University in Montreal, Canada in 1971.<sup>5</sup> It is the most frequently used tool in multidimensional pain assessment. MPQ is simple and can be filled out either by the patient or the physician. The McGill Pain Questionnaire can be used to evaluate a person who is experiencing a significant pain. Melzack and colleagues highlighted the usefulness of MPQ in diagnosing facial pain conditions such as trigeminal neuralgia and atypical facial pain.<sup>15</sup> This tool will help the clinician to monitor the pain over time and to determine the effectiveness of any intervention.

### **Short-form McGill pain questionnaire (SF-MPQ)**

In 1987, Melzack himself modified the MPQ and developed the short form of MPQ, as the standard MPQ takes too long to administer. **SF-MPQ** can be used when multidimensional assessment of pain is desired.<sup>16</sup> He showed that the SF-MPQ is valid to use in patients with dental pain as well. Dworkin *et al.* in 2009 further revised the SF-MPQ and came up with a new version of SF-MPQ (SF-MPQ-2). This new version is useful as a single measure of the major symptoms of both neuropathic and non-neuropathic pain. This can also be used in research and evaluating treatment response.<sup>17</sup>

### **Brief pain inventory (BPI)**

Brief pain inventory (BPI) is based on a tool known as the Wisconsin Brief Pain Questionnaire, which was originally developed by the pain research group of the World Health Organization Collaborating Centre for Symptom Evaluation in Cancer Care.<sup>18</sup> BPI is widely used to measure cancer pain. It measures both the intensity of pain (sensory dimension) and pain interference in the patient’s life (reactive dimension). The BPI also consists of questions about pain relief, pain quality, and the patient’s perception about the cause of pain. A convenient short-form of BPI has also been made available by the same authors.

### **Pain maps**

Pain map is a useful tool in clinical practice.<sup>19, 20</sup> Pain maps can be used for depicting not only the spatial features but also the interpretative or perceptual components of pain. Pain mapping can be made by the observer or by the patients. Depicting in maps may vary from simple line of drawing to color coded maps to show the severity and other qualities of pain. It indicates where the pain is sited and provides an inexpensive and permanent record which is simple to read and ease to comprehend. Pain maps are found to be valid, reliable and informative in recording radiation and referred pain. Using pain maps patients can transcribe more information that would be useful for the clinician to grasp a comprehensive picture of the condition. In assessing orofacial pain, frontal, lateral and rear views of the orofacial region are separately mapped. Full body maps are used to record widespread pain conditions.

### **Measuring pain in special categories of patients**

Unfortunately, some patients cannot provide a self-report of pain verbally, in writing, or by other means such as body movements or expressions. Special tools are available for recording pain for those categories such as toddlers, infants or neonates, patients in old age or in any other debilitated conditions where communication or cognitive functions are compromised. Some of these tools are based on the observations of the behavior and surrogate reporting (family members, parents, care-givers) and physiological indicators such as heart rate, respiratory rate, and oxygen saturation etc.<sup>1,21</sup> When the patients are not in a position to communicate properly, facial expressions, verbalizations, body movements, altered interpersonal interactions, changes in routines and mental status and physiological changes are used as potential indicators of pain. However, giving a full account on all the special tools of pain assessment is beyond the scope of this paper.

### **Summary**

In addition to the medical history, physical examination and special investigations the tools described above will standardize the pain measurement and will assist in keeping comprehensive, permanent, valid and reliable records. These will facilitate in monitoring the outcome of intervention, in deciding to change the management strategies, in professional communication, in educating and providing feedback to the patients and in pain studies. All these will ultimately translate into improved patients care in practice.

### **Acknowledgements**

The contribution of Ms.H.A.E.D. Perera, of Department of Basic Sciences, Faculty of Dental Sciences by drawing illustrations is appreciated.

### **References**

1. Pallegama R, Jayalath T, Pinto V. Editors. Pain management: Current Concepts Part II. Kandy: Sri Lanka Association for the Study of Pain; 2011.
2. Pain Taxonomy. International Association for the Study of Pain (<http://www.iasp-pain.org/Content/NavigationMenu/GeneralResourceLink/PainDefinition/default.htm>)
3. Justin DM. Pain 2005- An updated Review: Refresher course syllabus. IASP press. Seattle: 2005.
4. Mogil J. Pain 2010. An Updated Review (Refresher Course Syllabus: 13th World Congress on Pain). International Association for the Study of Pain, IASP Press, Seattle: 2010.
5. Melzack R, Torgerson WS. On the language of pain. *Anesthesiology* 1971; 34(1): 50-59.

### Measurement of orofacial pain: a broader perspective

6. Rustoen T, Wahl AK, Hanestad BR, Lerdal A, Paul S, Miaskowski C. Age and the experience of chronic pain: differences in health and quality of life among younger, middle-aged, and older adults. *Clin J Pain* 2005; 21(6): 513-523.
7. Downie WW, Leatham PA, Rhind VM, Wright V, Branco JA, Anderson JA. Studies with pain rating scales. *Ann Rheum Dis* 1978 ;37(4): 378-381.
8. Price DD, Bush FM, Long S, Harkins SW. A comparison of pain measurement characteristics of mechanical visual analogue and simple numerical rating scales. *Pain* 1994; 56(2): 217-226.
9. Price DD, McGrath PA, Rafii A, Buckingham B. The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. *Pain* 1983; 17(1): 45-56.
10. Myles PS, Urquhart N. The linearity of the visual analogue scale in patients with severe acute pain. *Anaesth Intensive Care* 2005; 33(1): 54-58.
11. Myles PS. The pain visual analog scale: linear or nonlinear? *Anesthesiology* 2004; 100(3): 744; author reply 5.
12. Pallegama R and Jayalath T. Editors. *Pain management: Current Concepts Part I*. Kandy: Sri Lanka Association for the Study of Pain; 2010.
13. Galer, Jensen & Gammaitoni, 2003, All Rights Reserved. Jensen, M.P. (in press). Pain assessment in clinical trials. In D. Carr & H. Wittink (Eds.), *Evidence, outcomes, and quality of life in pain treatment*. Amsterdam: Elsevier.
14. Melzack R. The McGill Pain Questionnaire: Major properties and scoring methods. *Pain*. 1975; 1: 277-299.
15. Melzack R, Terrence C, Fromm G, Amsel R. Trigeminal neuralgia and atypical facial pain: use of the McGill Pain Questionnaire for discrimination and diagnosis. *Pain* 1986; 27(3): 297-302.
16. Melzack R. The short-form McGill Pain Questionnaire. *Pain* 1987;30(2): 191-197.
17. Dworkin RH, Turk DC, Revicki DA, Harding G, Coyne KS, Peirce-Sandner S, et al. Development and initial validation of an expanded and revised version of the Short-form McGill Pain Questionnaire (SF-MPQ-2). *Pain* 2009; 144(1-2): 35-42.
18. Cleeland CS, Ryan KM. Pain assessment: global use of the Brief Pain Inventory. *Ann Acad Med Singapore* 1994; 23(2): 129-138.
19. Turp JC, Kowalski CJ, O'Leary N, Stohler CS. Pain maps from facial pain patients indicate a broad pain geography. *J Dent Res* 1998; 77(6): 1465-1472.
20. Schott GD. The cartography of pain: the evolving contribution of pain maps. *Eur J Pain* ; 14(8): 784-791.
21. Herr K, Coyne PJ, Key T, McCaffery M, Merkel S, Pelosi-Kelly J, Wild L. *Pain Assessment in the Nonverbal Patient: Position Statement with Clinical Practice Recommendations*. *Pain Management Nursing*, Vol 7, No 2 (June), 2006: pp 44-52.

## Unqualified dental practitioners or quacks in Sri Lanka

Dileep De Silva and N.T. Gamage

### Abstract

**Objective:** This survey was carried out to identify the number and distribution of Unqualified Dental Practitioners (quacks) in Sri Lanka, as an extension to a study done by the 1<sup>st</sup> author on the same subject in 2007.

**Methodology:** A structured questionnaire was administered to all Regional Dental Surgeons via telephone interviews.

**Results:** The number of dentists and quacks in Sri Lanka had increased by 16.5% and 9% respectively during the 5 year period from 2007-2012.

**Conclusion:** The market niche for quacks is getting saturated and quacks are not substitutes but competitors, for qualified dentists.

### Introduction

“Quackery” derives from the word *quacksalver* (someone who boasts about his salves). Dictionaries define *quack* as “a pretender to medical skill; a charlatan” and “one who talks pretentiously without sound knowledge of the subject discussed. Further according to Dorland’s Medical Dictionary for Health Consumers a quack is defined as: one who misrepresents their ability and experience in diagnosis and treatment of disease or effects to be achieved by their treatment.<sup>1</sup>

What impels quackery? It results when competent and trained practitioners are in short supply or when their charges appear prohibitive to a segment of the population. Then untrained individuals step in to supply a genuine need. The quack differs from the ethical practitioner in that the quack has no scientific professional education in the field he/she practises. Historically there had been dental quacks or unqualified dental practitioners during pre British, British and post independent Sri Lanka.

Two previous published studies by Ekanayake and De Silva gave important information about dental quackery in Sri Lanka.<sup>2,3,4</sup> Using dental students to obtain information about the existence of unqualified practitioners in their home towns, Ekanayake reported that there were approximately 90 such practitioners in Sri Lanka in 1989, while De Silva using a different methodology of focus group discussions at district level, concluded that there were 89 Unqualified Dental Practitioner (UDP) or Quack clinics, giving a ratio of 1 UDP clinic to 10 “legitimate” private dental clinics in Sri Lanka in 2007.<sup>3</sup>

A UDP or a quack was identified as a person who has not obtained a degree level qualification in dental surgery or dentistry, nor the mandatory registration from the licensing authority, namely the Sri Lanka Medical Council, to practise as a dentist in Sri Lanka.<sup>3</sup>

---

**Dileep De Silva** BDS.MSc.MS(Part1),MD.AIB(SL),MBA(Col),PhD(UK) Consultant, Institute of Oral Health, Maharagama. E-mail: mdkds@soton.ac.uk  
(Correspondence)

**N.T. Gamage** BDS, MSc, Attorney-at-law, Head, Institute of Oral Health Maharagama

### **The Legal aspect**

According to the “Section 311” of the Penal Code of the Democratic Socialist Republic of Sri Lanka, breaking a tooth or extracting a tooth is a criminal offense and a grievous hurt.<sup>5</sup> However Act No 26 of 1927 (Medical Ordinance) had given the authority for dentists to extract teeth. Further rules and regulations pertaining to dentistry appear in Sec: 43(1)(A) and Sec 49(3)(c) of the Medical Ordinance.<sup>6</sup>

According to the Sec: 49(3); The medical officers and apothecaries can practise limited dentistry in the absence of a qualified dentist. The dental therapist should work under the supervision of a dentist and that too restricted to the government sector.

In Sri Lanka to practise as a dentist a person should be registered in the Sri Lanka Medical Council (SLMC). In order to obtain Medical Council registration a person should have obtained a degree in Dentistry or Dental Surgery recognized by SLMC.

Therefore other than the above mentioned categories any other person engaged in provision of dental care services could be considered as a “quack”.

### **Global perspective**

Quackery in dentistry has been a global problem as far back as the earliest days when sufferers from dental ills sought relief from their aches at the hands of some type of practitioner. Some were genuine, some were quacks. Today, quackery is practiced in almost all parts of the world, from West Indies to Italy to Indonesia. In a study in Trinidad it was reported those using the services of dental quacks were more likely to have lower, self rated oral health while affordability and availability of dental treatment were identified as barriers to care from qualified dentists.<sup>7</sup> As reported by the president of the Italian dentists association: “15000 of Italy’s 71000 dentists lacked proper qualifications. Out

of these quacks 70% were dental technicians who practice as dentists. Of late, false degrees have been on the rise. They go and get them in countries like Romania which have recently entered the EU”. Millions of Indonesians, especially those from lower-income households, visit “local dentists” whenever they need some dental care. The problem is these “local dentists” are neither qualified nor legally allowed to practise what they do.

In present Sri Lanka, due to the paucity of government employment, every year nearly 80 newly qualifying dentists are forced to enter the private sector to make a living. Further due to the saturation of dentists in urban areas they are forced to venture into sub-urban and rural areas.<sup>7,4</sup> Furthermore the government dental clinics were well spread throughout the country employing approximately 1350 dentists by January 2012.<sup>8</sup> Moreover the population is fast becoming aware of medical (dental) malpractices by the unqualified people as we live in an information era. Also the purchasing power of the people is on the rise as we move into a middle income country.

This survey is conducted to identify the status of dental quackery in Sri Lanka in 2012, 5 years since the last survey. The results of this survey will be of immense importance to dental health planners, present dentists and dentists to be and law enforcing authority.

### **Methodology**

The method used in this survey was telephone interviews with the regional dental managers commonly known as Regional Dental Surgeons (RDSs). The telephone interviews were conducted using a well structured questionnaire. This method was selected due to its convenience, speed, cost effectiveness and reliability.

There are RDSs for each and every district of the country numbering 25 in total. All RDSs are government employed dentists with substantial

## Unqualified dental practitioners or quacks in Sri Lanka

amount of working experience in their respective districts.

As the first step a comprehensive list of RDSs was compiled. Their names addresses and contact telephone numbers were obtained from the Ministry of Health and Sri Lanka Dental Association which is the national body for dentistry in Sri Lanka.

The authors spoke to the RDSs over the phone to collect information about the quacks in their respective districts, after explaining them the nature of the research and obtaining their consent and a time best suited for them in a previous telephone call.

All RDSs were every cooperative and supported the survey to the best of their abilities. In situations

where RDS post was vacant or RDS was not sure, help of senior dentists from the respective district was obtained.

For comparison purposes in this survey, an unqualified practitioner or a quack was given the same definition as in the 2007 study.<sup>3</sup>

### Results

Table 1 gives the number of quacks in each district, as per the data collected through the telephone interviews are shown below, along with the distribution of quacks in 2007.<sup>3</sup>

The number of dentists trained by the sole Dentist training Institution namely the Faculty of Dental Sciences University of Peradeniya since 2007 is illustrated in the Table 2.

**Table 1.** Distribution of Unqualified Dental Practitioners in Sri Lanka

District	Number of quacks 2007	Number of quacks 2012	District	Number of quacks 2007	Number of quacks 2012
1. Colombo	17	16	14. Badulla	2	2
2. Gampaha	8	9	15. Monaragala	1	1
3. Kaluthara	5	6	16. Ratnapura	4	6
4. Kandy	6	7	17. Kegalle	3	3
5. Nuwara Eliya	2	2	18. Jaffna	2	8
6. Matale	3	3	19. Kilinochchi	1	0
7. Anuradhapura	2	3	20. Vauniya	1	0
8. Polonnaruwa	2	1	21. Mannar	2	1
9. Kurunegala	9	11	22. Mullatiuv	1	0
10. Puttalam	3	3	23. Tricomalee	2	2
11. Galle	5	5	24. Ampara	1	1
12. Matara	4	4	25. Batticaloa	2	2
13. Hambantota	1	1	<b>TOTAL</b>	<b>89</b>	<b>97</b>

**Table 2.** Number of dentists qualifying from the University of Peradeniya since 2007

Year	Number of dentists graduating from the Faculty of Dental Sciences University of Peradeniya
2008	78
2009	79
2010	64
2011	85

Source –Records at Faculty of Dental Sciences University of Peradeniya July 2012.

### Discussion

There were 1616 active dentists in Sri Lanka in 2007. They were distributed as 329 full time and 547 part time private practitioners, approximately 1000 employed by the Ministry of Health, around 55 each in the University staff and the Military. Further, it was reported that 54% of the Government sector employed dentists were engaged in provision of part time private practice, which is legitimate in Sri Lanka. It was highlighted that as far as the employment pattern was concerned; the largest group of dentists (approximately 1000) were the Ministry of Health employed followed by General Dental Practitioners (approximately 330) and the third largest was the Unqualified Practitioners numbering 89.<sup>3</sup>

According to the records at Sri Lanka Medical council around 20 foreign qualified Sri Lankan dentists had been registered since 2007(SLMC 2012).<sup>9</sup>

The above figures show that the number of dentists joining the profession had increased by 326 since 2007. Assuming a hypothetical zero attrition rate since 2007 the total number of active dentists in Sri Lanka should be (1616+326) 1942. However considering the facts that the average age of a dentist in Sri Lanka was 39.73 years and that the 3 decade long terrorist war is over and peace had returned to the country, it is the

expert opinion to assume an attrition rate not more than 3% for dentists during the period 2007 to 2012.<sup>3</sup> Accordingly Sri Lanka should have approximately 1883 active dentists by mid 2012. This means that the number of active dentists in the country had grown by 16.5% since 2007.

However, as illustrated in table 1 above, unqualified practitioners have increased from 89 to 97. This is an increase by nearly 9% during period 2007 to 2012. The only exception was the Jaffna district in the Northern Province, where the number of quacks had increased by more than threefold during last 5 years. However, there was a noteworthy reduction in the number of quacks in other districts of the Northern Province.

There is a very strong positive correlation between the number of dentists and the number of quacks in almost all districts, once again challenging the anecdotal evidence that quacks open up clinics due to the lack of qualified dentists.

Further, when compared with the results of the 1989 survey, it is interesting to note that the number of quacks had increased by less than 9% even over a period of 23 years.<sup>2</sup>

In some districts it was reported that though the number of quack practices (clinics) had not changed the “practitioner” had changed due to aging or death of the incumbent quack. In these

situations it was an offspring or a close relative of the senior quack who continues the quackery practice.

Another noteworthy feature of quacks is that over 90% of them are males who have had some “exposure” in the field of dentistry. Most of them had worked as dental technicians or dental surgery assistants before.

Other phenomenon observed was that some of the quackery practices had become legitimate clinics over long period of time. How this had happened is interesting. With passage of time some quackery practices get well established and hence earn high income. Then the quack practitioner to make the practice a legitimate entity and to improve the image of the practice, as well as to uplift his/her social status employs a newly qualified dentist (who is pending government employment) to work in the clinic and he (quack) becomes a “non working” principal. If the principal quack is not practising at all, then this practice is no longer a quackery practice.

There is no doubt, that the existing long awaiting time for the newly graduating dentists to obtain state sector employment, had helped the established quacks to legitimate his/her practice. Quackery practices becoming legitimate clinics may also be one of the reasons for the number of quack practices to remain almost static.

However, if the principal quack practises either when the dentist is on leave or alongside the qualified dentist, this practice by definition remains a quackery practice.

The interpretation of above observations is that although the number of quacks has increased, the niche market for dental quackery is getting saturated or already saturated. Therefore less number of quacks wishes to enter into this market niche. The reasons for less demand for services provided by the quacks would be; the presence

of ever increasing number of qualified dentists, increased awareness about unqualified practitioners among the patients, and increased purchasing power of the people.

The ratio of private dental clinics manned by the qualified and unqualified was around 10:1 in 2007.<sup>3</sup> Present survey showed that this ratio may have improved slightly since 2007. However, there is no bench marked ratio for clinics of dentists and quacks or qualified and unqualified.

Theoretically the number of quacks should decrease with the increasing number of qualified dentists. However, this concept does not seem to be holding true and the study findings reconfirmed the conclusion of the 2007 study that “quacks are not substitutes for qualified dentists but are in competition with them”.<sup>3</sup> Moreover the quacks remained the 3<sup>rd</sup> largest dental service provider group in Sri Lanka.

### **Conclusion**

The unsuspecting patient hoping to get their dental problem a quick and easy remedy often ends up with botched procedures that are not only painful but also destructive. Often these untrained workers cause more harm than good and, in some cases, do irreparable damage to the patient.

The number of dentists and quacks in Sri Lanka had increased by 16.5% and 9% respectively during the 5 year period from 2007-2012. These findings while suggesting that the market niche for quacks is getting saturated, also reconfirms the conclusion of the 2007 study that “quacks are not substitutes for qualified dentists but are in competition with them”<sup>3</sup>.

Although the market for dental quackery seems to be getting saturated in Sri Lanka, it is critical that the government regulate and control health services to ensure the highest levels of service and to protect the citizens from falling prey to unqualified practitioners. In an era where blood borne diseases such as Hepatitis B and HIV are

wide spread, the control of dental quackery should be considered seriously and should be given priority. The existing laws should be amended to impose severe punishments for medical and dental quackery and there should be better coordination between the Department of Health, Dental profession and the law enforcing agencies to tackle this national problem.

8. Directorate of Dental Services, Recruitment Records at the office of Deputy Director General of Dental Services, Ministry of Health Sri Lanka. 2012.
9. SLMC. Dentist Register of the Sri Lanka Medical Council. 2012.

## References

1. Dorland's Medical Dictionary for Health Consumers. [Accessed May 2012]. Available at: [www.thefreedictionary.com/sources.htm](http://www.thefreedictionary.com/sources.htm)
2. Ekanayaka, A.N.I. and Samarasinghe, S.W.R., The economics of dental care in Sri Lanka: A profile of unqualified practitioners. *Community Dental Health*, 1989; 6: pp.11-21
3. De Silva, D. "Supply and demand dynamics and operational characteristics of the private sector dental care provision in Sri Lanka". Doctor of Medicine (MD) Thesis. Post Graduate Institute of Medicine: University of Colombo. 2007
4. De Silva, D. The Distribution of Private Sector Dental Practitioners and Clinics in Sri Lanka. *Sri Lanka Dental Journal* 2010.vol 40 (1)
5. Penal Code of the Democratic Socialist Republic of Sri Lanka.
6. Act No 26 of 1927 -Medical Ordinance of the Democratic Socialist Republic of Sri Lanka.
7. Naidu, R.S. Perceptions and use of dental quacks (unqualified dental practitioners) and self rated oral health in Trinidad. *Int Dent J* 2003; 53 (6):447-54.

## **Review of clinical performance of resin-bonded bridges over a five year period**

**M.C.N. Fonseka, U.U.K.P.C. Perera, K.A. Wettasinghe**

### **Abstract**

**Objective:** To assess the debond rates of resin-bonded bridges(RBB) over a five year period.

**Material and methods:** All records of patients with resin bonded bridges provided by the Department of Restorative Dentistry, Faculty of Dental Sciences, Peradeniya within the period of March 2006 to March 2011 were assessed. Of these, only cantilever resin bonded bridges replacing a single tooth were taken into consideration under the present study. The age, gender, tooth that was replaced, the abutments used and the method of preparation was documented along with the type of luting cement.

**Results:** Of the 32 patients provided with cantilever resin bonded bridges 18 were male. Age ranged from 18 years to 44 years. Of the replacements, 17 (53%) were upper central incisors and 9 (28%) were upper lateral incisors. Three or 9.5% replaced lower central incisors whereas another 3 (9.5%) replaced upper premolars. Discolouration was evident on one abutment of a bridge replacing a lower central incisor. There was no evidence of caries on the abutment teeth within this review period. Of the

32 RBB's there were 3 instances of debonding over the period of review. The debond rate was 9.3%. Ten of the 32 bridges had been cemented using RelyX™ (3M ESPE USA) and 22 had been cemented using Panavia EX™. The mean review period was 2.28 +/-1.20 years.

**Conclusion:** Resin bonded bridges provided at the Department of Restorative Dentistry, Faculty of Dental Sciences have a low debond rate within a 5 year review period.

### **Introduction**

Teeth play a vital role in defining facial aesthetics. With the ever changing socio-demographic principles, facial aesthetics and appearance play a pivotal role in defining an individual. This definition may well be the turning point of ones life or career and thus most individuals pay a great deal of attention, time and effort to maintain an acceptable appearance. They often try to achieve the perfect smile in order to gain attention. As the dental surgeon is entrusted with the task of providing treatment to improve dental aesthetics such demands may add to the treatment burden of the dental profession as a whole.

---

**Dr. Manil Fonseka**  
(Correspondence)

BDS, LDSRCS (Eng), MS (Restorative Dentistry). Senior Lecturer, Department of Restorative Dentistry, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka. Tel: 077-630456  
E-mail: manchris@pdn.ac.lk

**Dr. U.U.K.P.C. Perera**

BDS, MS (Restorative Dentistry), Senior Lecturer, Department of Restorative Dentistry, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka.

**Prof. K. A. Wettasinghe**

BDS, MS, FDSRCS (Eng & Edin) Professor in Restorative Dentistry, Department of Restorative Dentistry, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka.

In this respect loss of a tooth or teeth may pose a serious aesthetic, psychological and functional debility to the patient concerned. They may consider themselves left out and orphaned as a result of such tooth loss. Numerous studies done on the affects of loss of teeth on the oral health related quality of life (OHRQoL) have revealed startling results proving that there is a negative impact of loss of teeth on the Quality of Life.<sup>1</sup> Teeth are commonly lost due to caries, non-carious tooth substance loss, periodontal disease, trauma, developmental disorders leading to hypodontia, surgical causes and iatrogenic reasons. If the defect is in the aesthetic zone patients are often tempted to obtain a prosthesis to replace the loss. In addition the patients prefer the most inconspicuous, cheap, least destructive and least time consuming option. On the other hand with the availability of information in abundance it is not unusual for patients to seek the best. Thus it is the duty of a dental surgeon to be well versed and competent in providing the best options considering the patient's needs.

There are number of methods of replacing missing teeth. This could range from osseointegrated implants, conventional and resin bonded bridges, partial and complete dentures, orthodontic space closure or no treatment.<sup>2</sup> The treatment options would have to be considered on a case by case basis depending on the patients oral health, age, occupation, attitudes and needs, the health of the remaining teeth, periodontal status, availability of sound alveolar bone, medical complexities, dexterity and most importantly the cost.

Of the treatment options listed above osseointegrated implants have come to the forefront in managing missing teeth and is now considered the prime option in replacing a single missing teeth.<sup>3</sup> Since their introduction by branemark in the late 1960's implants have come a long way with more cost effective options available, better success rates and simplified protocols of usage. However their use may still be limited in certain cases eg; very young patients,

where implant bearing bone is unavailable.<sup>3</sup> In addition the cost of treatment would still be a limiting factor.

Conventional bridges have been the god-father of fixed prostheses as it offers versatility and acceptable long term outcomes which is time tested. The prime factor governing its use would be the availability of healthy abutment teeth and short edentulous spans. However, it is considered the most destructive treatment option in managing missing teeth. Studies have shown that the vitality of abutment teeth are compromised in 25% of teeth over a five year follow-up period with the incidence of non-vitality rising from 60 to 90% over a 10-15 year followup period.<sup>4</sup> However, the currently accepted norm is that the treatment options should always be as non-invasive as possible. In this respect conventional bridges do not satisfy this requirement.

Resin-bonded bridges, adhesive bridges or fixed partial dentures have become one of the main treatment options for a single missing tooth. This has evolved from the periodontal splint introduced by Rochette in the 1970's where perforated cast metal wings were used to splint periodontally compromised teeth.<sup>5</sup> These splints depended on mechanical locking through perforated wings for retention. However, debonding was a common problem identified in these early designs. With the advent of modern bonding systems these bridges have been given a new lease of life as the retention rates have shown a drastic improvement over the last 2-3 decades.

Various designs have been proposed for resin bonded bridges. These rang from wings on either side of the pontic, cantilevered designs and double cantilevers. Various degrees of tooth preparations have been proposed ranging from no preparation, provision of a finish line, insertion of retentive grooves, rests, clasps to extensive palatal preparations. However, a majority are of the view that a minimal or no preparation with a single cantilever wing from the pontic is the least

destructive and offers a comparable retention rate to that of the designs with wings on either side of the pontic.<sup>6</sup>

Resin bonded bridges (RBB's) offer certain advantages in that they are least destructive with no preparation of abutment teeth needed in a majority of cases. In addition they can be used in young individuals where large pulp chambers of abutment teeth restricts the usage of conventional bridges. On the other hand immaturity and remodelling of the gingivae and alveolar bone respectively limits the use of implants in this age group. In addition it is easily reversible as there is minimal tooth damage in preparation of teeth and subsequent removal. An acceptable aesthetic outcome can also be achieved with these RBB's. A significant disadvantage in these bridges is that there is a higher chance of debonding compared to conventional bridges. The health of the abutment teeth is also critical as resin bonded bridges are only indicated with unrestored or minimally restored abutments. The span of the edentulous area is also a limiting factor where RBB's are rarely used to replace more than one missing tooth in an edentulous area.<sup>6</sup>

Considering the non invasiveness and retrievability of this treatment modality a RBB's is the second best option after implants in replacing a single missing tooth. It is also considered an interim option for replacement of missing teeth in young individuals until they reach the age where other more definitive options become viable. They could be recommended for replacing missing anterior teeth and to a lesser extent on posterior teeth provided the occlusal forces and their distribution is carefully assessed prior to planning.

As the high probability of debonding is the most common cause of failure of RBB's this study was carried out to assess the debond rate of single cantilever resin bonded bridges provided at the Department of Restorative Dentistry, Faculty of Dental Sciences, University of Peradeniya.

### Materials and methods

All records of patients provided with resin bonded bridges within the period of March 2006 to March 2011 were recruited for this study. Of these patients who were provided with RBB's with wings on either side of the pontic (fixed fixed RBB's) and bridges replacing more than 1 tooth were excluded from the study. In addition patients who had not attended at least one review was also excluded. Thus only cantilever resin bonded bridges replacing a single tooth was included in the study (Fig. 1). The age, gender, tooth replaced, the abutment used and the method of preparation was documented along with the type of luting cement used.

The patients had been reviewed annually or assessed when the bridge had de-cemented. On these review appointments the mobility of the bridges, fremitus on loading the pontic and any evidence of caries or discolouration on the abutments were assessed. Debond rates and frequencies were assessed. The bridges of patient's who presented with a debonded RBB was re-cemented with available resin cement after grit blasting the wings and removing the remnants of cement on the abutments with pumice. Such patient's were then put on an annual review schedule or asked to return if the bridge de-cemented.

All the bridges were cemented using either Panavia™ (Kuraray, Japan) or RelyX™ (3M ESPE USA)

### Results

A total of 71 resin bonded bridges were provided in the Department of Restorative Dentistry, Faculty of Dental Sciences during the period of assessment. Of these 58 were cantilevered resin bonded bridges. Of these 58 bridges only 32 patients had attended at least one review appointment with traceable records. Of these patients 18 were male and 14 were female patients (Fig. 2). Age ranged from 18 years to 44 years. Of the teeth replaced 17 (53%) were upper

central incisors using the contralateral central incisor as an abutment and 9 (28%) were upper lateral incisors with the central incisor as the abutment. Three or 9.5% replaced lower central incisors with a wing onto the lower lateral incisor whereas another 3 (9.5%) replaced upper premolars with a wing onto the adjacent premolar (Fig. 3).

Discolouration was evident on one abutment of a bridge replacing a lower central incisor. There was no evidence of caries on the abutment teeth within this review period.

All teeth replacing incisors (29 RBB's) had a finish line in the cervical region on palatal aspect of the abutment teeth with a pit of 0.5mm in the cingulum area. The abutment teeth holding RBB's replacing premolars had a mesial and distal rest preparation of 0.5mm depth with mesial and distal grooves.

Of the 32 resin bonded bridges there were 3 instances of debonding over the period of review with one bridge debonding twice. Thus the debond rate was 9.3%. The bridge that debonded twice was a replacement of a missing upper central incisor.

Ten of the 32 bridges were cemented using RelyX™ (3M ESPE USA) and 22 were cemented using Panavia EX™ (Kuraray, Japan) (Figure 4). The mean review period was 2.28 +/-1.20 years. One resin bonded bridge was provided to replace a congenitally missing upper lateral incisor. The rest of the bridges were provided to replace teeth lost due to caries or trauma (Fig. 5).

### Discussion

The debond rate of resin bonded bridges in this study was 9.3% which is slightly higher than studies done with similar inclusion and exclusion criteria.<sup>7,8,9,10</sup> However, the rate of debond could be considered acceptable with a 90.7% survival rate over an average review period of 2.28 years. This study only assessed the survival rate of cantilevered RBB's as many records of patients

provided with fixed-fixed RBB's could not be traced and assessed. Although in theory fixed-fixed designs should offer better retention, a principle drawback is that if abutments on either side of the pontic is used there would be differential loading on the abutments during function. This would result in tension developing on the cement holding the wings and as resin cements are proved to be weak in tensile strength, debonding is more likely to occur in fixed fixed designs. As the entire prosthesis moves with the single abutment, Cantilevered RBB's does not face this scenario. This has been supported by research which has compared the debond rates of RBB's of the two designs. Such studies have concluded that there is no statistically significant differences between the survival rate of the two designs though slightly favouring the canilever RBB's.

Some schools of thought advocate using a double cantilever design where two abutment teeth on one side of the pontic is used for retention. Such designs have been suggested to mitigate the chances of debonding though there is no strong scientific evidence to support the fact that they show superior retention.<sup>6,7</sup>

Studies comparing the debond rates of anterior and posterior resin bonded bridges have shown a higher debond rate of posterior cantilevered RBB's.<sup>10</sup> Occlusal forces could possibly account for the differences in debond rates. Although there were 3 patients managed with provision of posterior cantilevered RBB's the individual debond rates could not be assessed as the sample was too small and no debonds were reported within the follow-up period. Further some other studies have revealed mandibular RBB's to be inferior when retention rates are considered.<sup>7</sup> This aspect could not be compared aswell. Studies comparing the behavior of distal and mesial cantilevers have shown that mesial cantilevers perform better than distal cantilevers due to distal cantilevers being closer to the temporo-mandibular joint.<sup>7,8</sup> This was not evident in our study.

There is no clear consensus on the degree of preparation involving the abutment teeth in designing a resin bonded bridge. As resin-bonded bridges come to the forefront as a non-invasive treatment option no preparation should be done wherever possible. There is strong anecdotal evidence to suggest certain mechanical retentive features are desirable, especially in load bearing areas.<sup>6</sup> What is considered important is the actual patient selection and occlusal assessment.

Ideally patients who show very minimal occlusal contact on the proposed pontic areas would be the best candidates for RBB's. The design should be planned in such a way as to have minimal or no contact on the pontic on anterior and lateral excursions. A degree of contact would naturally occur on the wings lining the palatal surfaces of teeth but these forces should be compressive in nature directed in an axial direction.<sup>6,7</sup> Resin cements fare poorly when tensile stresses are given and thus any premature contact on the pontics leading to tension on the cement lute should be avoided. Such features were planned and incorporated into the design which would have contributed to the acceptable level of survival.

The use of an appropriate cement is critical in determining the retention of RBB's. By definition resin bonded bridges require a resin cement to be used for cementing the bridge. Commonly used cements are RelyX, Panavia and Superbond. These have shown superior results when compared with other resin cements.<sup>6,7,12,13</sup> All the bridges selected for the study were cemented using either Panavia or RelyX. However the efficacy of the two cements were not assessed clinically within this study. Thus care should be taken when selecting a cement for this purpose and due consideration given to their performance in clinical studies. In addition the manufacturers instructions should be strictly adhered to if success is to be expected. As with all resin cements a near dry moisture free environment should be maintained throughout the bonding procedure due to the resins inherent

hydrophobicity and resultant failure of bonding. The cost of such resin cements and possibility of repeat cementations have to be considered in evaluating the best options for managing single missing teeth.

Surface treatment is another important consideration in improving retention.<sup>12,14</sup> Grit blasting is one of the common ways of surface treatment. This imparts a degree of roughness which increases the surface area for attachment. It also results in an increase in surface energy which leads to rapid adsorption of the cement used. It is considered mandatory to grit blast all wings of RBB's delivered to patients as per protocol prior to cementation and thus the effect of grit blasting on the debond rates of RBB's could not be assessed.

Apparant discolouration was evident on the abutment of one RBB replacing a lower central incisor though the tooth was vital. The colour of the wing seen through the tooth was the reason for the discolouration and this is especially evident in abutment teeth with a narrow bucco-lingual thickness. This could be considered a drawback of the use of RBB's especially in the lower anterior region where the bucco-lingual thickness of teeth are minimal.

Caries and trauma remained the most common cause of replcement of missing teeth. As these are the most common modes of loss of teeth in adoloscent patients RBB's may be proposed as a suitable treatment modality especially in patients who are mindful of aesthetics and are not amenable to removable options.

### **Conclusion**

The Debond rates of correctly planned single unit cantilevered resin bonded bridges is 9.3% and is within the expected range of debond rates seen in similar studies. When considering its non-invasive nature it should be considered as a viable option in replacing single missing teeth.



Figure 1. Cantilevered Resin Bonded Bridge

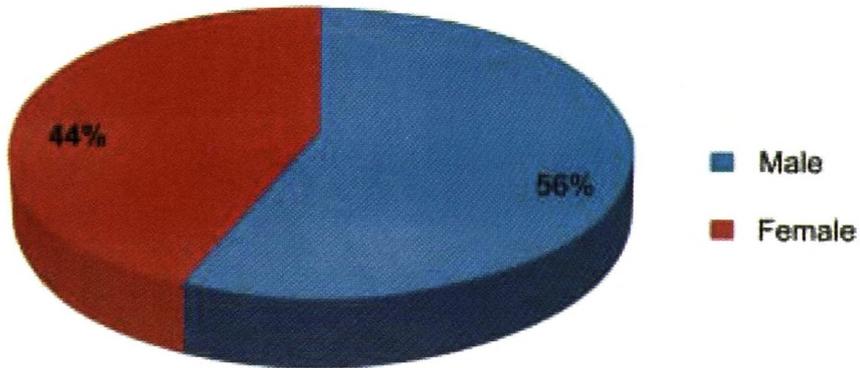


Figure 2. Gender distribution of Resin Bonded Bridges Provided

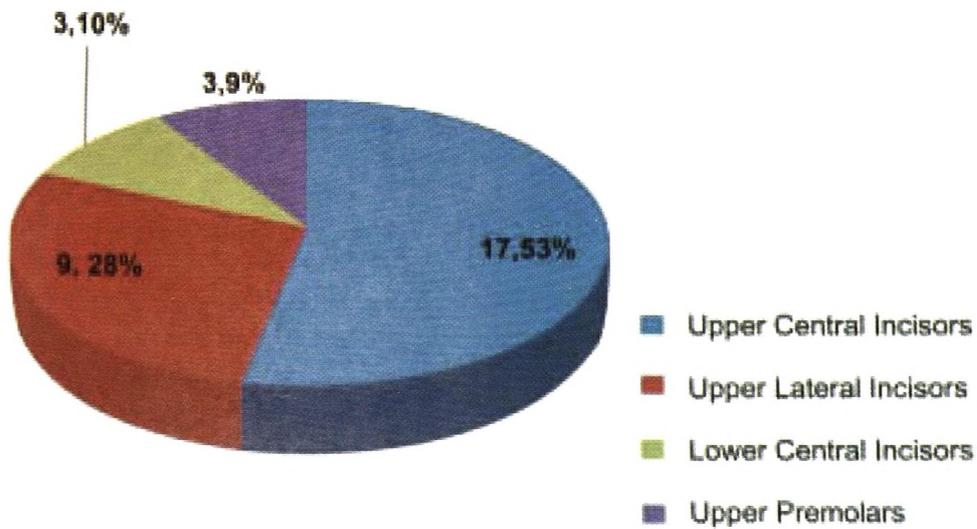
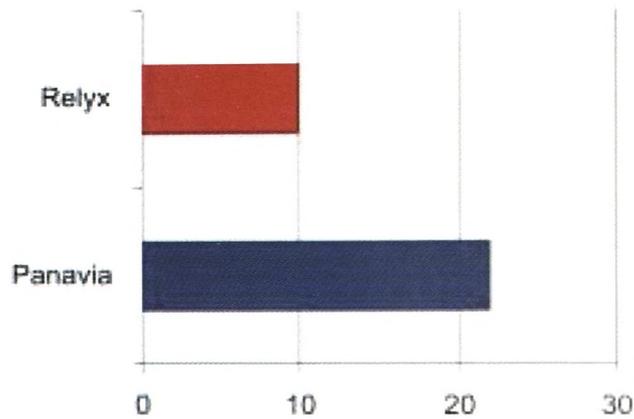
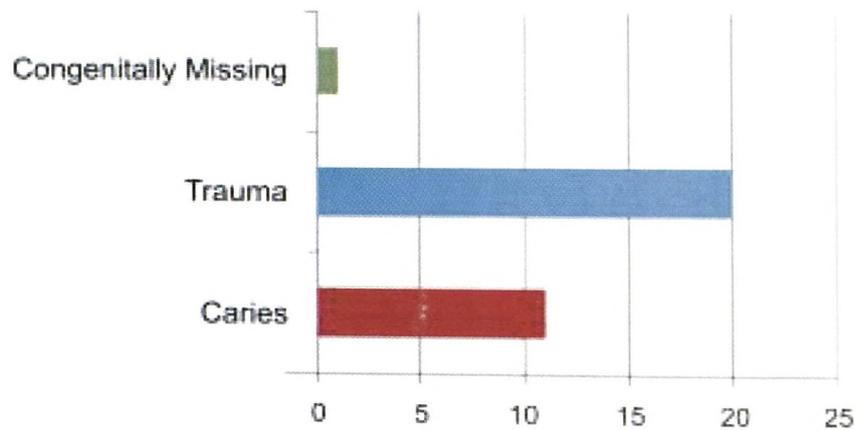


Figure 3. Tooth replaced by Resin Bonded Bridge

Review of clinical performance of resin-bonded bridges over a five year period



**Figure 4.** Types of Cement used for luting the Resin-Bonded Bridge



**Figure 5.** Causes of loss of teeth

**References**

1. Gerritsen, AE Allen PF, Witter DJ, Bronkhorst EM, Creugers NHJ. Tooth loss and oral health-related quality of life: a systematic review and meta-analysis. *Health and Quality of Life Outcomes* 2010, 8:126
2. Abt E, Carr AB, Worthington HV. Interventions for replacing missing teeth: partially absent dentition. *Cochrane Database Syst Rev.* 2012 Feb 15; 2: CD003814.
3. Martel VA. Replacement of a Single Missing Tooth With an Implant-Supported Patient-Specific Restoration. *Vistas - Dawson* 2009 July/August; 2(2): 5-10
4. Cheung GSP, Dimmer A, Mellor R, Gale M. A clinical evaluation of conventional bridgework. *Journal of Oral Rehabilitation* 1990;17:131-136
5. Rochette AL. Attachment of a splint to enamel of lower anterior teeth. *Journal of Prosthetic Dentistry* 1973;30: 418-423.

6. George GS, Hemmings K, Patel K. Resin-retained Bridges Re-visited Part 1. History and Indications. *Primary Dental Care* 2002; 9(3): 87-91
7. Dunne SM, Miller BJ (1993) A longitudinal study of the clinical performance of resin bonded bridges and splints. *British Dental Journal*; 174: 405-411
8. Hussey DL, Linden GJ (1996) The clinical performance of cantilevered resin bonded bridgework. *Journal of Dentistry*; 24(4): 251-256
9. Vallittu PK (2004) Survival rates of resin bonded, glass fiber reinforced composite fixed partial dentures with a mean followup of 42 months: A pilot study. *Journal of Prosthetic Dentistry*; 91(3): 241-246
10. De Kanter RJAM, Creugers NHJ, Verziiden CWGJM, Van't Hof MA. A five year multi-practice Clinical Study on posterior Resin Bonded Bridges. *Journal of Dental Research*; 1998; 77(4): 609-614
11. Chan AWK, Barnes IE. A prospective study of cantilever resin-bonded bridges: An initial report. *Australian Dental Journal* 2000; 45(1): 31-36
12. Van Dalen A, Felzer AJ, Kleverlaan CJ. The influence of surface treatment and luting cement on in vitro behavior of two unit cantilever resin-bonded bridges. *Feilzerntal Materials*; 2005; 21(7): 625-632
13. Pjetursson BE, Tan WC, Tan K, Brägger U, Zwahlen M, Lang NP. A systematic review of the survival and complication rates of resin-bonded bridges after an observation period of at least 5 years. *Clin Oral Implants Res.* 2008 Feb; 19(2):131-141.
14. Kohli S, Levine WA, Grisius RJ, Fenster RK. The effect of three different surface treatments on the tensile strength of the resin bond to nickel-chromium-beryllium alloy. *Journal of Prosthetic Dentistry* 1990; 63: 4-8.

### Solitary fibrous tumour of the oral mucosa: A rare tumour with unpredictable behaviour

P.R. Jayasooriya, P.R.C.L. Karunathilaka, R.M.A.S. Rathnayaka, R.M.P. Ratnayaka

#### Abstract

Solitary fibrous Tumour (SFT) is a perivascular tumour, which is currently recognized as a lesion with uncertain malignant potential and unpredictable behavior. Although originally it is described as a pleural based lesion occurrence in a wide variety of extra-pleural locations such as orbit, oral cavity, salivary glands, upper respiratory tract, abdominal cavity, thyroid, kidney, stomach, prostate and soft tissues of proximal extremities has been documented. This report is based on a 29 year old male who presented with a SFT of the tongue. Comparison of the present case with SFTs of other oral mucosal sites, reported in literature is undertaken to create awareness among Dental Professionals regarding this rare entity.

**Key words:** solitary fibrous tumour, extra-pleural location, metastasis

#### Introduction

Solitary fibrous Tumour (SFT) is a rare spindle cell perivascular neoplasm that is believed to be of mesenchymal origin probably arising from myofibroblasts.<sup>1,2</sup> Dilemma regarding the origin of SFTs which made debates either to its

mesothelial origin or mesenchymal origin has been resolved with the occurrence of SFTs in variety of anatomic sites that are not lined by mesothelium supporting the mesenchymal origin. WHO classification (2002) considers SFT as a rarely metastasizing fibroblastic/myofibroblastic tumour with uncertain malignant potential.

SFT can occur in extra pleural locations and interestingly head and neck region is a common location for extra pleural SFTs.<sup>2</sup> Approximately, 153 cases of SFTs in the head and neck region has been reported in the literature.<sup>3-11</sup> When SFT occurs in the oral cavity the most common locations are buccal mucosa (the commonest intraoral location) and tongue.<sup>2</sup> To the best of our knowledge the literature revealed only 50 cases of SFTs involving the oral cavity out of about 900 total cases of SFTs.<sup>1-13</sup>

The oral SFTs can arise within a wide age range usually from 20 to 80 years of age and shows a slight female preponderance.<sup>9</sup> There are no documented cases of recurrences or metastasis following surgical removal of intraoral SFT.<sup>3,11</sup> However, some recent cases were not followed up adequately, contributing to the apparently successful outcome described for oral SFT.

**Dr. P.R. Jayasooriya**  
(Correspondence)

BDS, PhD (Japan), Senior Lecturer in Oral Pathology, Department of Oral Pathology, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka. Tel: +94-81-2397435 Fax: +94-81-2388948 E-mail: primalij@yahoo.com

**Dr. P.R.C.L. Karunathilaka**

BDS, Temporary Lecturer in Oral Pathology, Department of Oral Pathology, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka.

**Dr. R.M.A.S. Rathnayaka**

BDS, MS Oral Surgery, Consultant, Oral and Maxillofacial Surgeon, Base Hospital, Matale.

**Dr. R.M.P. Ratnayaka**

MBBS, MD (Pathology), Consultant Pathologist, Teaching Hospital, Kandy.

### Case Report

In September 2010, a 29 year old male patient presented to the Oral and Maxillofacial surgical unit of the General Hospital, Matale, Sri Lanka complaining of a small lump on the tip of the tongue of more than one month duration. The patient's medical and dental histories were non contributory. Clinical examination revealed a 2 cm x 1 cm size oval shaped lump of a colour similar to normal mucosa on dorsal aspect of anterior tongue close to the tip. Incisional biopsy was obtained with the clinical impression of minor salivary gland tumour and sent for histopathological investigations. Macroscopically the specimen consisted of one whitish soft tissue measuring 0.4 x 0.5 x 0.4 cm in size. Histopathologically an unencapsulated tumour which was composed of cytologically bland spindle cells arranged into a pattern less pattern was identified (Fig 1). Endothelial lined vascular spaces and myxoid stroma was noted focally. Giant cells lining pseudovascular spaces were also present infrequently. Based on the histopathological features, following differential diagnoses; neurilemmoma, neurofibroma, haemangiopericytoma, solitary fibrous tumour, giant cell angiofibroma were considered. Subsequently in order to arrive at a definitive diagnosis, immunohistochemical staining with S-100, CD34, Bcl2, SMA and CD31 was performed. The tumour cells showed positive immune reactivity for CD34 (Fig 2) and Bcl2 while negative for S-100. Negative result for S-100 immunostaining resulted in exclusion of neural tumours while haemangiopericytoma was excluded due to more fibrous nature of the lesion. In addition, although giant cell angiofibroma was considered in the differential diagnosis, it being an orbit based lesion and fewer vascular spaces observed in the present lesion led to its exclusion. Considering all the histopathological features and immunohistochemical results a definitive diagnosis of solitary fibrous tumour was made. Following the initial diagnosis the patient is awaiting further management which is surgical excision of the lesion. In addition, in view of the unpredictable

behavior of this lesion which may sometimes result in metastasis, close follow up was recommended.

### Discussion

Pleural SFT was first described by Klemperer and Rabin in 1931.<sup>1,2,4</sup> The lesion with similar histopathological features were observed in extra pleural locations exposing a buried entity to pathology (as extra pleural SFTs).<sup>3</sup> Pleural fibroma, fibrous mesothelioma localized fibrous mesothelioma, localized fibrous tumour, localized mesothelioma, pleural fibroma, solitary fibrous mesothelioma, submesothelial fibroma, subserosal fibroma are former terms that have been used for SFT.<sup>2</sup>

No significant sex predilection for SFTs of tongue is observed (Table 1), in contrast female predilection is observed for SFTs of buccal mucosa (Table 1). Similar female predilection is also reported for SFTs of all oral sites in literature.<sup>3,11</sup> It is not a tumour of children, and comparatively large lesions occur in buccal mucosa than tongue (Table 1).

Generally, malignant entities such as synovial sarcoma, mesenchymal chondrosarcoma and benign or reactive lesions such as leiomyoma, myofibroma and nodular fasciitis are considered in the differential diagnosis of SFT. In addition, myxoid forms of SFT may mimic benign nerve sheath tumour, myxoid liposarcoma, myxoid synovial sarcoma and spindle cell lipoma.<sup>1,2</sup> However, in the present case, the histopathology was that of a benign tumour and a prominent myxoid component was not evident. Therefore, low grade sarcomas as well as tumours with a myxoid component were not included in the differential diagnosis. Immunohistochemistry plays a major role in the confirmation of the diagnosis of SFT; similarly it was utilized to make the final diagnosis in the present case. SFT shows positive immunoreactivity for antibodies directed against CD34, Bcl2 and CD99 molecules.<sup>1,2,14</sup>

Positive immunoreactivity for vimentin is also reported in some cases of intra-oral SFTs in the literature.<sup>2,4</sup> Absence of immunoreactivity of SFT for antibodies directed against EMA, SMA and S-100 is useful to exclude other disease entities in the differential diagnosis.

A haemangiopericytomas (HPC) and SFTs are two lesions considered to be in one spectrum of tumours. The two entities differ in the relative proportion of cells and fibrous stroma present in the tumours.<sup>1</sup> The more cellular end of the spectrum is considered as HPC while classic SFT representing the less cellular end in the spectrum of tumours.<sup>1</sup> Some tumours may also contain hybrid features consisting of both cellular areas containing spindle cells arranged into short ill defined fascicle and fibrous stroma showing ropey collagen and collagen coated vessels. In addition, some authors have divided SFTs in to two well defined patterns namely 'classic pattern' and 'sclerotic pattern'.<sup>2</sup> Sclerosis is the main feature of sclerotic type of SFT and contains mast cells that are probably responsible for the sclerosis.<sup>2</sup> This feature was absent in our case. Other variants of HPC-SFT include lipomatous HPC-SFT, meningeal HPC-SFT and giant cell angiofibroma.<sup>1,12</sup> According to JK Chan (1997) following histopathological features are useful when diagnosing SFTs.<sup>15</sup>

1. Circumscription
2. Alternating hypocellular sclerotic foci and hypercellular foci of spindle cells
3. Short spindling or ovoid cells with scanty and poorly defined cytoplasm
4. Few mitotic figures (<4 /10 HPF)
5. Intimate intertwining of thin or thick collagen fibrils with spindle cells
6. CD34 positivity of spindle cells

Considering all the features described above our case was diagnosed as a SFT as the lesion showed densely cellular areas and hypocellular areas with variable amount of collagen and vascular stroma.<sup>1</sup> Table 2 gives the comparison of histopathological

features between classic SFT and classic HPC with the histopathology of the present case.

Impact on systemic health due to oral SFT is minimal with the exception of swallowing and speech difficulties. But the literature revealed certain large SFTs reported in other extra pleural location and their association with hypoglycemia and nail clubbing.<sup>1,13</sup> Hypoglycemia is thought to be due to secretory products of the tumor (secretion of Insulin like growth factor). However, these features were not observed in the present patient.

Following surgical removal of the oral SFT no evidence of recurrences has been reported in the literature to the best of our knowledge.<sup>6</sup> According to a study by Regan *et al.* (2009), no evidence of recurrences or metastasis was found in 17 cases of SFT of oral cavity after average duration of 54 months.<sup>2</sup> But malignant transformations and metastasis related to non-oral extra pleural SFTs can be found in the literature (especially SFT located in retro peritoneum). It is estimated that 5-20% of pleural SFTs behave aggressively with local extension, recurrence, propagation and distant metastases.<sup>11</sup> Clinical presentation of SFT as non pedunculated lesion with the size of more than 10cm together with histopathological features of increased cellularity, pleomorphism, mitoses more than 4 per 10HPF (high power fields), necrosis and hemorrhage increase the suspicion of malignant nature.<sup>1,2</sup> However, it is known that in majority of SFTs potential biological behavior was not consistently related to atypical histomorphological features observed in the lesions. Therefore, although, none of the atypical histomorphological features were present in our case, close follow up was recommended after the excision of the lesion due to the unpredictable behaviour reported for non oral SFTs.

### Conclusion

Though the occurrence of solitary fibrous tumours in the oral cavity is not very common, awareness

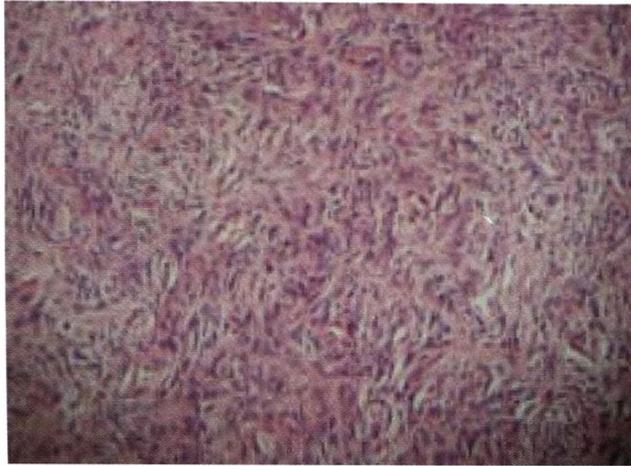
of the lesion is essentially valuable for the management due to the unpredictable behavior of the tumour. As it has morphology similar to many benign and malignant tumours, awareness among Pathologists regarding this lesion is also important for arriving at an accurate diagnosis.

**Table 1. Comparison of oral SFTs on Buccal mucosa and Tongue**

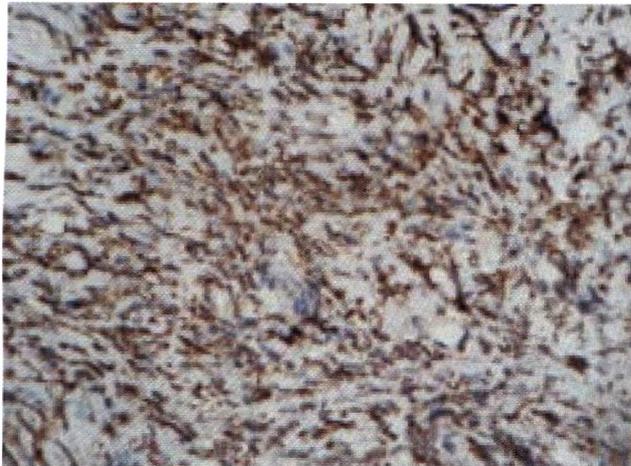
Some reported cases of SFT on buccal mucosa	Size in greatest dimension (cm)	Gender	Age (years)
1	1.5	Male	83
2	2.0	Male	55
3	1.5	Female	34
4	2.5	Female	57
5	4.0	Male	70
6	2.0	Male	27
7	2.0	Male	56
8	1.5	Female	45
9	1.0	Male	70
10	3.0	Male	46
11	0.8	Female	51
12	4.0	Female	20
13	3.0	Male	30
14	7.0	Male	46
15	7.0	Female	83
16	7.5	Male	94
Total 16	Range 0.8-7.5cm	M:F 5:3	Mean age 54.18years Range 20-94years
Some reported cases of SFT on tongue			
1.Left side tongue	3.0	Female	75
2.Anterior tongue	4.0	Female	65
3.Anterior tongue	1.0	Male	66
4.Anterior tongue	3.0	Female	57
5.Anterior tongue	3.0	Male	48
6.Anterior tongue	2.0	Male	29
Total 6	Range1 - 4 cm	M:F 1:1	Mean age 56.6 years Range 29-75 years

**Table 2. Comparison of histopathological features of classic SFT and classic HPC with the present case**

Feature	Classic SFT	Present case	Classic HPC
Pattern	Spindle cells arranged in to short ill defined fascicles. (pattern less pattern)	Spindle cells arranged in to a pattern less pattern.	Round to fusiform cell with indistinct cytoplasmic borders arranged around vascular spaces
Cellularity	Hypo and hyper cellular areas present within the tumour	Hypo cellular areas were not marked	Uniformly cellular throughout the lesion
Blood vessels configuration	Vessels showing a Stag horn configuration is present	Although, vascular spaces were evident, Stag horn configuration was infrequently noticed.	A prominent Stag horn (antler like) configuration is noted in blood vessels seen trough out the lesion
Hyaline coated vessels	May or may not be present	Present	Present
Ropey collagen	Present	Not present	Usually not present
Myxoid stroma	Focally myxoid stroma present	Although present, it was not prominent	Myxoid changes are absent
Giant cells	May or may not be present	Present	Absent
Distribution	Lining pseudo vascular spaces	Lining pseudo vascular spaces	- - -



**Figure 1.** Low power view (x10) of the SFT showing spindle cells arranged in to a pattern less pattern.



**Figure 2.** Immunohistochemical demonstration of CD34 positivity in tumour cells.

## References

1. Weiss SW, Goldblum JR. Enzinger & Weiss's soft tissue tumours, 5<sup>th</sup> edition, China, Elsevier 2008;1121-113.
2. O'Regan EM, Vanguri V, Allen CM, Eversole LR, Wright JM, Woo SB. Solitary fibrous tumour of the oral cavity: clinicopathologic & immunochemical study of 21 cases. *Head & neck Pathol* 2009; 3: 106-115.
3. Talacko AA, Aldred MJ, Sheldon WR, Hing NR. Solitary fibrous tumour of the oral cavity: reports of two cases. *Pathol* 2001; 33: 315-318.
4. Alawi F, Stratton D, Freedman PD. Solitary fibrous tumour of oral soft tissue: a clinicopathologic and immunohistochemical study of 16 cases, *Am J Surg Pathol* 2001; 25: 900-910.

5. Mentzel T, Bainbridge TC, Katenkamp D. Solitary fibrous tumour: clinicopathological, immunohistochemical & ultrastructural analysis of 12 cases arising in soft tissues, nasal cavity & nasopharynx, urinary bladder & prostate. *Virchow Arch* 1997; 430: 445-53.
6. Kodana S, Fujita K, Suzuki M. 24 cases of solitary fibrous tumour in paranasal sinuses. *Auris Nasus Larynx* 2009; 36: 100-103.
7. Cox DP, Daniels T, Jordan RC. Solitary fibrous tumor of the head and neck. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2010;110: 79-84.
8. Vafiadou M, IDimitrakopoulos, Georgitzikis I, Hytioglou P, Bobos M, Karakasis D. Solitary fibrous tumor of the tongue: case report and literature review. *Int J Oral Maxillofac. Surg.* 2008; 37: 1067–1069.
9. Shimoyama T, Horie N, Ide F. Solitary Fibrous Tumor of the Palate: A Case Report and Review of the Literature. *J Oral Maxillofac Surg* 2004; 62: 895-897.
10. Fusconi M, Ciofalo A, Greco A, Pulice G, Macci M, Mariotti M, Rocca CD. Solitary Fibrous Tumor of the Oral Cavity: Case Report and Pathologic Consideration *J Oral Maxillofac Surg* 2008; 66: 530-534.
11. De Marcos JAG, De Vera JLDCP, Rodríguez SA, Arenas MG, Polanco JC. Intraoral solitary fibrous tumour: clinical, pathologic, and immunohistochemical analysis *Rev Esp Cirug Oral y Maxilofac* 2008; 30(3): 180-184.
12. Piperi E, Rohrer MD, Pambuccian SE, Koutlas IG. Vascular solitary fibrous tumor with “floret” cells or giant cell angiofibroma? a lingual example highlighting the overlapping characteristics of these entities and positive immunoreaction for estrogen and progesterone receptors. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009;107: 685-690.
13. Rena O, Filosso PL, Papalia E et al. Solitary fibrous tumour of the pleura: surgical treatment, *European Journal of Cardiothoracic Surgery* 2001; 19(2): 185-189
14. Van Roggen JFG, Hogendoorn PCW. Solitary fibrous tumour: the emerging clinico-pathologic spectrum of an entity and its differential diagnosis. *Current Diag Pathol* 2004; 10: 229-235.
15. Chan JK. Solitary fibrous tumour-everywhere and a diagnosis in vogue. *Histopathology.* 1997;31:568-76.

## **Instructions to Authors**

The Sri Lanka Dental Journal publishes the following categories of articles which have relevance to Dentistry and allied sciences.

1. **Leading articles** - One article per issue. It may be solicited by the Editor. Authors are welcome to submit leading articles on current topics of interest. One's expertise or commentaries on general practice etc. They should be approximately 1500 words in length. References should be 20 or less.
2. **Reviews** - Reviews are detailed surveys of published research pertinent to dentistry and associated sciences. They should be critical in nature and should not normally exceed 3000 words and 30 references.
3. **Research articles** - Articles resulting from research work belong to this group. Results from routine clinical examinations or laboratory investigations will not be considered under this category. Subjects may vary from clinical trials to basic science research, historical analysis to dental economics. They should not exceed 3000 words and 30 references. A reasonable number of tables and illustrations will be accepted.
4. **Short reports** - These include reports on current topics, modified techniques, new materials, practice management etc. Interesting results from routine, clinical work or laboratory investigations also may be accepted.
5. **Case reports** - Reports such as of rare diseases or conditions. Modifications to accepted treatment procedures, new management methods etc. may be included in this category.
6. **Letters to Editors** - Subjects unlimited, but may include short critique of published papers in the SLDJ.
7. **Miscellaneous topics** - Subjects unlimited and the format are free. These may also include details of scientific meetings, conferences, annual sessions, examinations, news and views, visits and obituaries.
8. **Proceedings of annual sessions** - Abstracts from annual sessions of the SLDA and other colleges will be published under this category.

### **Submission of manuscripts**

Authors submitting a paper do so on the Understanding that no part has been published before, that it is not being considered for publication elsewhere and that it has been read and approved by all the authors.

Manuscripts including Tables and Figures should be sent in triplicate as the work will be reviewed by two or more referees. While papers are subject to editing, The journal does not hold it responsible for statements made by the contributor. The author alone is responsible for the statements made in his paper.

Submission of a manuscript means that authors automatically agree to assign exclusive copyright to the Sri Lanka Dental Association if and when the manuscript is accepted for publication.

### **Manuscript on disk**

Once an article has been accepted for publication, the author will be asked to supply a copy of the final manuscript on disk together with two copies of the complete manuscript. Every disk must be clearly labelled with the name of the author, title, software and program version number.

### **Manuscript style**

The manuscripts should be typed, double-spaced: on A4 (210x297 mm) paper and submitted in correct English: both English and American spelling are acceptable, provided this is consistent throughout the manuscript. Manuscripts not submitted in proper format or in poor English may be returned without review. The format of a manuscript should be as

follows: Title page. Abstract. Introduction, Material and methods. Results. Discussion. Acknowledgements. References. Figure legends. and Tables, arranged in that order.

**Title page** - The title page should contain the following information in the order given: 1) a concise but informative title; 2) author's full names' (without degrees and titles); 3) author's institutional affiliations; 4) a running title. not exceeding 40 letters and spaces; 5) name, address, telephone, telefax and electronic mail address of the author responsible for correspondence.

**Abstract page** - Original and review articles must contain an abstract of approximately 250 words with four specified subtitles:

- 1) **Objective:** An introductory sentence indicating the objective and purpose of the study.
- 2) **Material and methods:** A description of experimental procedure including applicable statistical evaluation.
- 3) **Results:** A summary of the new. Previous unpublished data and results.
- 4) **Conclusion:** A statement of the study's conclusion 3-5 key words according to Index Medicus should be provided.

**Introduction** - The introduction should carry sufficient background information on the subject of study.

**Material and methods** - Procedures should be described in such detail as to make it possible to repeat the work. Subheadings may be used to improve clearness. Correct unit abbreviations should be used (e.g.; "h", "min", "s" and "Fm" rather than "hr", "minutes", "sec" and "Fl". respectively).

The authors should consider the ethical aspects of their research and ensure that the work has been approved by an appropriate Ethical Committee. Where applicable, a copy of the ethical clearance certificate should be attached. In human experimentation. informed consent from individuals should be Obtained and this should preferably be stated.

**Statistical analysis** - Since many scientific investigations rely on statistical treatment, authors are strongly urged to consult a person with in-depth statistical knowledge. Manuscripts with a clear element of statistics are regularly refereed by the Journal's statistics consultant.

**Results** - The Results section should clearly and concisely present the findings of the research, as a rule in the past tense without subjective comments and reference to previous literature. The results should be supported by statistical or illustrative validation. For the sake of clarity this section may have subheadings. **Discussion** - This section should present the interpretations of the findings and is the only proper section for subjective comments. Authors are strongly urged to avoid undue repetition of what has been reported in Results.

**Tables** - The tables should be numbered in the order of appearance in Arabic numerals, Each table should have a brief explanatory title. Each table; should be typed on a separate sheet, with due regard to the proportion of the printed column/page.

**Figures** - All graphs, drawings, and photographs are considered figures and should be numbered in the order of appearance in Arabic numerals. Each figure should have a brief and specific legend, and all legends should be typed together on a separate sheet of paper. Photographs should be glossy prints and the reverse should give the figure number, title of paper principal author's name and have a mark indicating the top. Colour illustrations may be submitted in instances where their use may contribute significantly to the scientific value of the article. Colour illustrations may be printed free of charge at the Editor's discretion, whereas others may be printed at the author's expense.

**References** - References are listed double-spaced in a separate reference section immediately following the text. References are numbered consecutively in the order in which they appear in the text; do not, alphabetise. Identify references in texts, tables and legends by Arabic numerals (within parenthesis).

Congress abstracts should not be used as references nor may "unpublished observations" and "personal communications" be placed in the reference list. References cited as "in press" must have been accepted for publication and not merely in preparation or submitted for publication

Examples of correct forms of references are given below. These are based on the format used in the *Index Medicus*. Abbreviate journal names according to the *List of Journals Indexed*, printed annually in the January issue of *Index Medicus*. List all authors; do not use *et al.* in the reference list.

#### *Journals*

##### Standard journal article

Bartlett IG, O'Keefe P. The bacteriology of the perimandibular space infections. *J Oral Surg* 1979; 37: 407-409.

##### Corporate (collective) author

WHO COLLABORATING CENTRE FOR ORAL PRECANCEROUS LESIONS. Definition of leukoplakia and related lesions: an aid to studies on oral precancer. *Oral Surg Oral Med Oral Pathol* 1978; 46: 518-539.

##### Unpublished article

Barker DS, Lucas RB. Localised fibrous growth of the oral mucosa. *J Dent Res* 1965: in press.

##### Books and other monographs

Pindborg JJ Atlas of diseases of the oral mucosa. 5<sup>th</sup> edition. Copenhagen: Munksgaard, 1992: 50-66.

##### Chapter in book

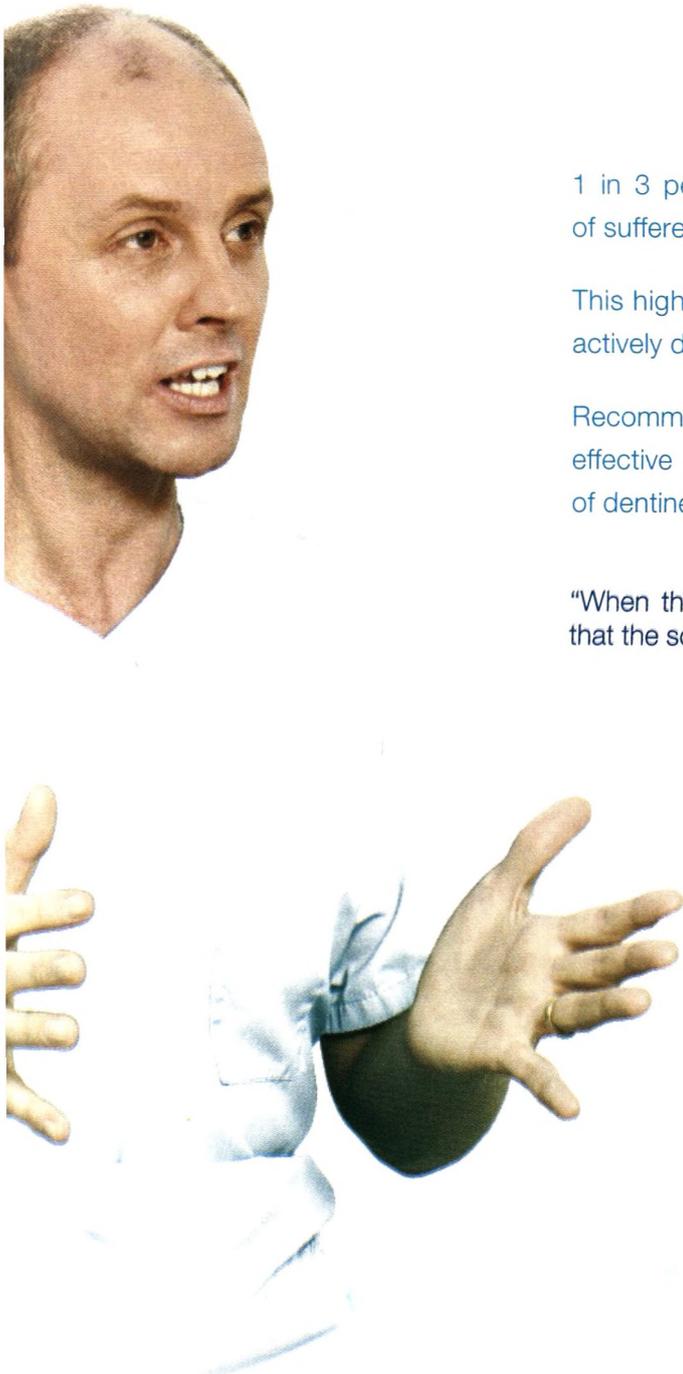
Boyde A. Amelogenesis and the structure of enamel. In: Cohen B, Kramer KH (eds). *Scientific Foundations of Dentistry*. William Heinemann Medical Books Ltd. London. 1976: 335-352.

##### No author given

International statistical classification of diseases and related health problems, 10<sup>th</sup> revision, vol 1. Geneva: World Health Organisation, 1992; 550-564

# “Most people are worried it is often something worse.”

Dr Nick Rote. East Finchley, UK



1 in 3 people suffer from dentine hypersensitivity and over 50% of sufferers don't mention it to their dental professional.<sup>1</sup>

This highlights the important role that dental professionals play in actively diagnosing dentine hypersensitivity.

Recommending daily brushing with Sensodyne is a simple, effective solution which is clinically proven to reduce the pain of dentine hypersensitivity.

“When they come back to see me next time, they're very pleased that the solution was given to them so easily.”



**SENSODYNE**

DAILY PROTECTION FROM THE PAIN OF SENSITIVE TEETH

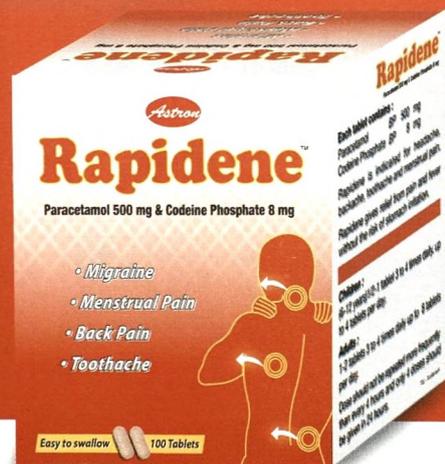
Strong Fast Acting Pain Relief

# Rapidene™

Paracetamol 500 mg & Codeine Phosphate 8 mg



**For Toothache  
and After Dental  
Extraction**



Manufactured & Marketed by

**Astron Limited**

688, Galle Road, Ratmalana, Sri Lanka. Tel : 2636741 Fax : 2636173

# With the Best Compliments from



Marketed by  
Darley Butler & Co Ltd.,  
No 98 ,  
Sri Sangaraja Mawatha,  
Colombo 10 .  
Tel : 2478780 / 9  
Fax : 2478776

# Kool Fresh

Thymol and Benzoic Acid  
ANTISEPTIC MOUTHWASH

- **Kills Bacteria**
- **Reduces halitosis & Odourigenic bacteria**
- **Reduces supragingival plaque<sup>(1)</sup>**
- **Reduces development of gingivitis**

“It is clear that oral antiseptic mouthwashes and dentifrice formulations have the potential to serve as adjuncts to mechanical methods of plaque control.”

— **Daniel Fine, DMD, University of Medicine and Dentistry of New Jersey**

“In addition to causing cell lysis in organisms responsible for plaque, gingivitis, and oral malodour, studies have shown that essential oil mouthwashes have strong activity against the gram-positive microbes such as *Streptococcus mutans*, that cause dental caries.” —**R. Seymour, School of Dental Sciences, University of Newcastle, UK**

#### **Composition:**

Thymol<sup>(2)</sup> N.F.- 0.013 %, Benzoic Acid B.P. - 0.018 %, Alcohol U.S.P.- 7.0 %  
Also contains Menthol & Eucalyptol

#### **Dosage:**

Rinse twice daily with about 15ml undiluted around teeth and gums, gargle and spit out after 1 – 2 minutes.

Preferably rinse after every meal. Consult Physician for use in Children below 12 years of age.

(1) Comparative antiplaque effectiveness of an essential oil and an amine fluoride/stannous fluoride mouthrinse. by Riep BG, Bernimoulin JP, Barnett ML.

(2) Dental uses of Thymol : Dental Medicine. A Manual of Dental Materia Medica And Therapeutics", by Ferdinand J. S. Gorgas. Also available from Amazon: Dental Medicine.



**A Truly Sri Lankan Mouthwash**

For further information

**Interpharm (Pvt) Ltd.**

476, Union Place, Colombo 02.

Tel: 0115 220400 email: interpharm@interpharm.lk

# ***Panadeine***

Paracetamol 500 mg + Codeine 8mg



# ***Has the power to relieve pain***



# Signal

## TOOTHPASTE

Sri Lanka's  
**No. 1**  
Brand,  
most trusted by  
Dentists\*



Rs. 17/-  
upwards

\*Based on market statistics and a survey conducted by an independent research company in 2011 with Sri Lankan dentists