Dental Abrasion Pattern in a Selected Group of Malaysians

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Abstract

Among 350 inhabitants of two villages, 31 (8.9%) cleaned their teeth using table salt and charcoal applied to their forefinger or a Melastoma brush. As a result, all had distinct forms of abrasion cavity on the labial surfaces of their teeth. All of the above three agents are highly abrasive and injurious to both the hard and soft oral tissues. This dying practice is only popular among a very small number of persons in the older age group, and should be discouraged.

Introduction

The pathologic attrition of tooth substance through some abnormal mechanical process is defined as tooth abrasion [¹]. This process may occur on any part of an exposed tooth. An abrasive dentrifice, stiff toothbrush or incorrect use of a toothbrush are the most important causes of dental abrasion. Constant and prolonged contact of the tooth surface with hard foreign objects such as bobby pins, pipe stems, iron nails and hair clips tends to produce abrasion cavities on the incisal edges or occlusal surfaces of the teeth that come into contact with such objects. Patients with abrasion do not usually complain of dentinal hypersensitivity, since reactive dentine is almost always laid down in sufficient quantity to protect the pulp from the external environment. However, on infrequent occasions, the rate of abrasion is so rapid that odontoblasts do not have enough time to manufacture reactive dentine, in which case patients may complain of dentinal hypersensitivity.

In Malaysia, another form of dental abrasion occurs, which is not widely known. The resulting cavities are mostly found on the labial surfaces of the anterior teeth and are caused by a combination of factors, including use of homemade toothbrushes made from stems of the plant Melastoma malabathricum, crushed charcoal and table salt. Here, we present our preliminary findings on this habitual practice by a small group of individuals in two remote villages in Malaysia.

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Materials and Methods

Visits were made to Kerilla and Kongsi Lima villages in the district of Tanah Merah, Malaysia, after it was learnt that there was a group of individuals in the villages who habitually clean their teeth using crushed charcoal, table salt and stems of the small tree, *Melastoma malabathricum*. The *Melastoma* stems were shaped by their users into toothbrush-like appliances. Three hundred and fifty inhabitants of the two villages between the ages of 18 and 65 years were asked about their tooth-cleaning habits. Those below 18 years of age were excluded, as they were attending school and therefore were unlikely to practice the habit. Only individuals who admitted cleaning their teeth using agents other than a conventional toothbrush and dentrifice were singled out for detailed examination of their teeth and gingivae with a mirror and probe. Particular attention was given to the pattern of toothwear. The frequency and duration of their tooth-cleaning habit were recorded.

Results

Thirty-one persons (8.9%) admitted cleaning their teeth using table salt, either alone or in combination with crushed charcoal. The agents were applied to the tip of the forefinger, which was then rubbed against the surface of the teeth, especially those easily visible and accessible. Through this tooth-cleaning habit, the labial surface of the anterior teeth received the greatest attention, followed by the buccal surfaces of the posterior teeth. The lingual and palatal surfaces received very little attention, as access with the forefinger was difficult and they are not easily visible. Eighteen out of these 31 persons admitted using a fibrous *Melastoma* stem instead of the forefinger as a “toothbrush” onto which the abrasive agents were applied. Eleven persons admitted using a *Melastoma* stem to brush their teeth without any other abrasive agent. All these patients showed tooth abrasion cavities of varying degrees of severity depending on the type of abrasive used, and the frequency and duration of practice. It was evident that those using salt and charcoal had more severe abrasion cavities than those who did not. The *Melastoma* stem when used alone, without charcoal or salt, caused slight abrasion of the teeth, but considerable damage to the gingivae because of its very coarse and rough fibers (Figs. 1, 2).

The patients ranged in age from 35-55 years. Older patients were edentulous and thus had ceased to clean their teeth. The duration of the habit was 15-30 years with a frequency of toothbrushing of 1-2 times daily. As the number of patients involved was small in this preliminary study, no detailed description is given of all the findings obtained in the patients. Instead, two cases considered by the authors to be representative of the condition are described below.

Figure 3 shows a typical example of abrasion cavities caused by use of the combination of table salt and charcoal applied to the finger tip. The extensive abrasion cavities have exposed the dentine. Although the pulp cavities are visible, the teeth remain vital and were not hypersensitive to external stimuli. Because the finger tip is smooth, the gingivae were not traumatised when the patients cleaned their teeth, and hence in the absence of any significant amount of dental plaque,
they remained healthy.

Figure 4 shows a typical example of a patient’s teeth and gingivae that had been subjected to additional use of a coarse-fibered *Melastoma* brush, which caused not only tooth abrasion, but also traumatised the gingivae, which appear swollen and inflamed. The labial surfaces of the anterior teeth are heavily abraded, exposing the dentine which is stained darkly by the juice of the betel quid which the patient habitually consumed. The occlusal surfaces of the teeth are heavily abraded almost to the gum level as a result of chewing hard dried betel nut over a very long period. No patient complained of tooth hypersensitivity.

**Discussion**

This preliminary study has revealed details of a traditional and primitive method of tooth-cleaning using table salt, charcoal and a *Melastoma* brush. Although for very many years modern toothbrushes and dentrifices have been available of the two villages in question, a few individuals still retain their own methods of tooth-cleaning learnt from their ancestors. These few individuals belong to an older age group within the community who refused to change. Table salt and charcoal are believed by their users to cleanse and whiten the teeth. Unfortunately, however, teeth treated in this way turn less white or even yellowish, as the enamel layer is removed to expose the dentine. The taste of salt when used alone or in combination with charcoal gave the users a feeling of oral cleanliness and well-being.

The abrasion cavities found in the present study showed a distinct morphology very different from those already documented in the literature due to various known causes. The abrasive particles of table salt and charcoal created deep concave cavities into the dentine on the labial surface of the anterior teeth, as shown in Fig. 3, leaving only a thin rim of enamel on the mesial and distal aspects of the teeth. The cavities were characteristically smooth and shiny, and seemed to fit the shape of the ventral surface of the forefinger that had been used to clean them. It was noteworthy that the teeth were quite clean. The slight degree of gingival inflammation of the interdental papillae between the first bicuspid and the central incisor teeth was due to a small amount of dental plaque that had accumulated around the neck of these teeth. This patient was 45 years old and he had been brushing his teeth using salt and charcoal on the tip of his forefinger once or twice daily for a period of 20 years.

The abrasion cavities in Fig. 4, although also seen on the labial surface of the anterior teeth, were not concave in shape but flattened with less surface shine and smoothness. This patient, aged 48 years, had used table salt and charcoal with a *Melastoma* brush, once or twice daily for 25 years. It is conceivable that the course-fibered *Melastoma* brush had applied cleaning pressure on the labial surface of the teeth equally in all directions, resulting in a flat abrasion cavity. The gingivae in this patient were generally edematous and inflamed. This was due to accumulation of plaque around those teeth which the *Melastoma* brush had not been able to reach, besides the direct trauma and injury to the gingivae caused by the brush.
Although in both these patients and many others in the survey, the pulp cavities were visible from the anterior side, they remained sealed with secondary dentine. Radiographs showed reduction in the size of the pulp cavities due to deposition of secondary dentine over a long period. Hence the teeth remained vital and were not hypersensitive to external stimuli.

The *Melastoma* brush is made from the stem of a plant which grows wild in rural Malaysia, being easily obtainable and very familiar to most residents. It grows abundantly as a small shrub in areas from the Mascarene Islands to Australia, extending to the remote islands of the Pacific. The vegetative parts of the plant are astringent and are widely used by local residents as a medicine for treatment of diarrhea and wounds\(^2\). It has also been claimed that *Melastoma* extract possesses hemostatic and anti-dysenteric properties and hence is indicated for the treatment of melena and wound bleeding\(^3\). Melastomic acid, a triterpenoid, and B-sitosterol, a dyestuff, have been isolated from the *Melastoma* plant\(^4\). Melastomic acid is known to be an astringent and to possess hemostatic properties\(^4\).

To make a *Melastoma* brush, a stem of *Melastoma malabathricum* about 1 cm in diameter is selected and a length of about 10 cm is cut from it. A small mallet is then used to pound both ends of the stem until the fibers separate to form bristles which can function as a 'brush' for cleaning the teeth (Figs. 1, 2).

The *Melastoma* brush is probably not dissimilar in its function and action from the siwak (or miswak), which is popular among certain groups of people in Middle East countries. The siwak is a toothbrush made from the twig of the *Salvadora persica* tree after its twigs have been soaked in water to produce moderately stiff fibers which can be used to clean the teeth. It contains sodium bicarbonate, tannic acid and other astringents, which are claimed to have a beneficial effect on the gums\(^5\).

This preliminary study has thus disclosed a form of oral cleaning that is injurious to the teeth and gingivae. Although the authors found it difficult to dissuade the persons involved from continuing this primitive tooth-cleaning habit, it was evident that younger inhabitants in the two villages were not taking up the practice. It is not known how widespread this habit is in Malaysia at present, although the authors believe that the practice is dying out. A more extensive survey of this habit is now being carried out by the authors.

References

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Fig. 1  The *Melastoma* brush. The length and circumference of the handle which carries the ‘bristles’ at both ends are about 10 cm and 1 cm, respectively. It is made from the stem of the plant *Melastoma malabathricum*.

Fig. 2  End-on view of the *Melastoma* brush. The bristles are very coarse and rough. It is onto these bristles that crushed charcoal and/or table salt are applied before tooth-brushing.

Fig. 3  The abrasion cavities on the labial surface of the anterior teeth are smooth and shiny, and concave in shape. The concave morphology seems to conform to the convex shape of the ventral surface of the forefinger. The pulp cavities are visible on the bicuspid and the central incisor teeth.
There is only minimal inflammation of the interdental papillae.
Fig. 4 The abrasion cavities on the labial surface are flat and not concave, and many of them are stained by betel nut quid. The severe attrition of the incisal and occlusal surfaces is due to betel nut-chewing. The gingivae are hypertrophic and inflamed.