

Efficacy of NMAB and NMAB-urea as chemomechanical caries removal reagents

Chemomechanical removal of dental caries in deciduous teeth: further studies in vitro
H K Yip, A G Stevenson and J A Beeley *Br Dent J* 1999; 186: 179–182



Objective

To further investigate the efficacy of N-monochloro-DL-2-aminobutyrate (NMAB) and NMAB containing 2M urea (NMAB-urea) as chemomechanical caries removal reagents in deciduous teeth using standardised lesions and limited applicator pressure.

Design

In vitro.

Method

Cariou dentine was removed from standardised lesions in deciduous teeth using NMAB, NMAB-urea or isotonic saline (control); 50 lesions were studied with each reagent. The surface of the dentine remaining in cavities where complete caries removal was achieved was examined by light and scanning electron microscopy.

Main results

NMAB-urea (but not NMAB) gave significantly improved caries removal compared with saline. The dentine surfaces remaining after complete caries removal were irregular and approximately one third were bacterially contaminated.

Comment

This paper addresses a topical subject in which there is a resurgent interest. The NMAB chemical discussed in this paper was the main active ingredient in the Caridex system. Extensive research show its clinical efficacy, safety, patient acceptance and compatibility with filling materials.^{1–4} However, Caridex was not consistently efficacious for caries removal, used large volumes of solution, took too much time to employ, had a poor shelf-life, and needed a heated reservoir and a pump solution delivery.

As also mentioned in the paper, a new method of chemomechanical caries removal CCR has been developed called Carisolv. The major differences from Caridex are a different amino acid composition, an increased sodium hypochlorite concentration, the solution consistency (and colour) and new instruments. Despite using much greater volumes of liquid, none of the three solutions in the present study has resulted in better caries removal than Carisolv. Although the addition of 2M urea improved caries removal compared with saline, urea toxicity might be a problem clinically.

Chemomechanical caries removal is particularly suited for:

- Patients with phobias to either needles or drills
- Patients where conservation of tooth tissue is a prime requirement

Conclusions

The improved efficacy of NMAB by the addition of urea has been confirmed. Toxicity studies are still necessary prior to clinical use of this reagent.

In brief

- There is a resurgence of interest in chemomechanical removal caries removal systems.
- The improved efficacy of caries removal *in vitro* of NMAB by the addition of urea has now been confirmed.
- The improved formulation is suitable for removing caries in deciduous teeth.
- The dentinal floors remaining after complete caries removal are suitable for bonding with dentine adhesive

- Patients for whom local anaesthesia is contra-indicated such as those with severe medical complications
- Children and adolescents especially when they would require an inferior dental block
- Older patients with root caries.

The achievement of local anaesthesia can take about 5 minutes. If this can be avoided, as is the case in about 95% of patients treated with CCR, then the increased time required for the CCR method as compared with conventional drilling, is probably not significant. As it is possible to work in several quadrants of the mouth with CCR this can further reduce potential discomfort. It is notable that patients' perception of the time taken for the caries removal is that the CCR takes a shorter time compared with drilling and this could be described as an extension of wishful thinking.

In addition there are many clinical situations which are particularly suited for the use of CCR. These include root carious lesions, open caries lesions, very deep carious lesions where we wish to attempt to avoid the creation of a traumatic exposure, secondary caries around the margins of crowns or bridges and carious lesions in deciduous teeth.

The paper also comments on the fact that the prepared cavity surface structure following CCR is very different from that seen after conventional cavity preparation

when using a drill. The topography is highly irregular, as has previously been shown with the Caridex system. This may increase the surface area for bonding and thus possibly improve bond strengths to certain adhesive materials.

Work has proven that CCR significantly reduces cariogenic micro-organisms, probably due to the oxidants within the product, as well as the high pH. This antimicrobial effect may well also be significant in the management of deep carious lesions. This paper adds to our knowledge of CCR, a topic of increasing interest to both practitioners and patients.

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Early treatment of pseudo Class III malocclusion in mixed dentition

Management of pseudo Class III malocclusion in southern Chinese children
A B M Rabie and Y Gu *Br Dent J* 1999; 186: 183–187



Aim

To illustrate a simple effective method for early treatment of pseudo Class III in the mixed dentition and to highlight the advantages of early treatment by showing a 4-year follow-up of the treatment effects.

Subjects

Twenty-one consecutive southern Chinese patients with a mean age of 9.6 years were included in the early treated group with pseudo Class III malocclusion.

Methods

Lateral cephalometric films taken at the beginning and at the end of treatment were analysed. The arithmetic mean and standard deviation (SD) were calculated for each cephalometric variable and paired *t*-tests were performed to assess the statistical significance of the treatment effects.

Results

Anterior crossbites and mandibular displacements were eliminated after the treatment. The angulation of the upper incisors to the maxillary plane showed an increase by a mean of

9.5° ($P < 0.001$), while the angulation of the lower incisors to the mandibular plane showed a decrease by a mean of 4.9° ($P < 0.001$).

Conclusion

In pseudo Class III malocclusion, proclination of upper incisors and/or retroclination of lower incisors with simple fixed appliances contribute to the correction of anterior crossbite and the elimination of mandibular displacement. Proclination of upper incisors, use of Leeway space and arch width increase provide space required for the eruption of the premolars and canines.

In brief

- This study illustrates a simple effective method (2x4) appliance for early treatment of pseudo Class III malocclusion in mixed dentition.
- It also emphasises treatment planning and treatment sequence.
- It highlights the advantage of early treatment of pseudo Class III malocclusion by following up the cases for a period of 4 years.

Comment

Early correction of upper incisors in lingual occlusion is desirable to minimise attrition of the labial surfaces of the upper incisors, periodontal problems and to allow the later erupting teeth to come into occlusion on an undisplaced jaw relationship.

This correction may be achieved using removable, functional or fixed appliances or with extra-oral devices such as a face mask or chin-cap. The method described has the advantage of being simple and does not involve any extra-oral mechanism. It also neatly answers the problem of retention which bedevils removable appliances when deciduous molars have been extracted.

British readers will be intrigued by the unaccustomed cephalometric values. There seems little doubt, however, that the appliance is effective in proclining upper incisors. What is surprising is the significant retroclination of lower incisors in view of the fact that only two patients had appliance therapy in the lower arch. It would appear that the development of a substan-

tial overbite has maintained the corrected incisor relationship and this has resulted in the lower incisors being tipped lingually. This sort of effect is well-known and I remember being taught this as an undergraduate student all those years ago.

Other eye-catching cephalometric values are the very small changes in SNB and ANB which raises the question of whether the patients had an initial displacement.

The authors claim that the use of an upper fixed appliance with rectangular wire permits palatal root torquing of upper incisors. It is not immediately obvious why they should want to do this in Class III cases and the amount of torquing cannot be substantial over a period of 2–3 months. In an appliance of this kind, palatal root torque is the same as labial crown torque if the arch-wire is not restrained and labial crown torque is the tooth movement which occurs most readily.

There is nothing new in the 2x4 fixed appliances but it is interesting to see how

effective it can be in Chinese children, and I would heartily endorse the concept of treating postural Class III malocclusion at the earliest possible stage.

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Craniofacial patterns of southern Chinese children with Class II Division I malocclusion

Cephalometric morphology of Chinese with Class II Division I malocclusion
JW Lau and U Hägg *Br Dent J* 1999; 186: 188–190



Aim

To investigate the craniofacial pattern of southern Chinese children with Class II Division 1 malocclusion and to compare with Chinese population norms and Caucasians with Class II Division 1 malocclusions.

Materials

Lateral cephalograms obtained from 105 Chinese subjects with Class II Division 1 malocclusion.

Results

There were no significant sex differences and subsequently the data were pooled. Except for the maxillary plane angle and the angle of the lower incisor relative to the mandibular plane, all of the selected dental-skeletal angular measurements showed significant differences between Chinese with Class II Division 1 malocclusion and Chinese norms.

Conclusion

Compared with Caucasians, Chinese with Class II Division 1 malocclusion have more prognathic maxillas, less retrusive mandibles, flatter chins, steeper mandibular plane angles and more proclined maxillary incisors.

In brief

- This study shows that there are morphological ethnic differences in Class II Division 1 subjects.

Comment

Although average or normal cephalometric values have been reported in the literature for Chinese people this study focuses on the dentofacial morphology of Chinese adolescents with Class II Division 1 malocclusion. Class II Division 1 malocclusions represent a large proportion of every orthodontist's caseload. A good understanding of the dental and skeletal components, which contribute to this common malocclusion, is an essential prerequisite of successful orthodontic treatment. The Chinese diaspora is such that all orthodontists have an interest in the unique dentofacial characteristics of this racial group.

The authors found that when Chinese adolescents with Class II Division 1 malocclusion were compared with Caucasians with the same malocclusion the Chinese group had more prognathic maxillas and less retrusive mandibles. The bimaxillary prognathism found in the Chinese Class II Division 1 group is not altogether surprising since previous researchers have found that the normal Chinese dentofacial mor-

phology involves a degree of bimaxillary dental and alveolar protrusion.¹ The authors also found that when the Chinese and Caucasian Class II Division 1 malocclusions were compared, the upper incisors of the Chinese group were more proclined by an average of 10°.

From the perspective of orthodontists who are involved in the daily toil of overjet reduction the degree of upper incisor proclination that exists in Chinese with Class II Division 1 malocclusion is of particular interest. Orthodontists much prefer to find proclined upper incisors in patients with increased overjets rather than upright incisors which often require difficult and anchorage demanding bodily movement and torquing. The finding that Chinese people with Class II Division 1 malocclusion have more proclined upper incisors than their Caucasian counterparts appears to be good news for the orthodontist. The dilemma for the orthodontist is whether he should retrocline the upper incisors to the norm value for Chinese people (118° to the

maxillary plane) or to the normal value for Caucasians (108° to the maxillary plane). Although cephalometric norm or average values exist for upper incisor inclination for different racial groups, no scientific studies have determined how far upper incisor inclination can deviate from the average value before adversely affecting dental aesthetics or occlusion. Perhaps it is dilemmas such as this that provoked Berger to comment that norm values were like monsters: they were created by the orthodontists as servants and have now become masters.²

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