The Importance of Using Fixed Reference Points in Studies of Collagen Crosslink Inhibition on Impeded and Unimpeded Eruption of the Rat Incisor

Norman Randall Thomas

Chancellor, International College of Craniomandibular Orthopedics USA, Faculty of Medicine and Dentistry, University of Alberta, Canada.

*Corresponding Author: Norman Randall Thomas, Chancellor, International College of Craniomandibular Orthopedics USA, Faculty of Medicine and Dentistry, University of Alberta, Canada.

LETTER TO EDITOR

Addition of a known lathyrogen 0.1 per cent beta aminopropionitrile in the drinking water of rats produces significant differences in the unimpeded and impeded eruption rates of rat mandibular incisors compared with pair fed controls when utilizing fixed amalgam implants in the alveolar bone as reference. No significant differences are observed when the impeded tooth, occlusal plane nor gingival margin are taken as the references. The findings indicate that intrusion of the impeded reference teeth occur to an increased degree in the lathyritic condition. Given that lathyrogen reduces intramolecular and intermolecular crosslinks of collagen, it is concluded that collagen maturation clearly plays a significant role in tooth support and eruption.

INTRODUCTION

Dr John E Eastoe of the Department of Dental Science Royal College of Surgeons of England closed the seventh and final session of the Edward Colston Research Society Symposium No 27 at the University of Bristol on April 7th 1975 with the celebrated quote on the motion of heavenly bodies by Galileo Galilei referring now to the axial movements of the teeth in the process of tooth eruption: ‘Er pur si muovono-And yet they move’.

In my paper ‘Collagen as the Generator of tooth eruption’ at that Symposium I referred to a study I had undertaken in my PhD thesis in which I had violated the principle of using fixed references in assessing the impeded and unimpeded eruption of the rodent incisor.
Table 1 shows the effect of the lathyrogen 0.3% Acetoaminonitrile bisulphate (AAN) on the inhibition of collagen crosslinks and hence on tooth eruption in young 54 gm. rats. The results appeared significantly positive for the hypothesis of tractional theory of collagen on tooth eruption using the Bryer (1957) technique. Drs Berkovitz BKB, Migdalski A & Solomon M (1972) ‘The effect of the lathyritic acetonitrile on the unimpeded eruption rate in normal and root resected rat lower incisors’ in Archs oral Biol 17:1755-1763 using the same agent 0.1% AAN in the drinking water on older rats which I also had found somewhat insignificant. For these reasons and given that lathyrogen is known to reduce both intra molecular and intermolecular crosslinking of collagen as to cause bending (dilaceration) of the roots of impeded teeth from chewing hard food pellets and thus affect the measurement of tooth eruption. It was therefore decided to use the lathyrogen beta aminopropionitrile 0.1% BAPN in the drinking water of 12 older rats viz: 180-190gm. for comparison with control animals utilizing amalgam implants as fixed reference in the accompanying alveolar bone.

Table 2.

It is now clearly apparent that collagen cross-links act as agents of tractional force of eruption and as supporting mechanism in the periodontium as seen in the results of Table 2. In Table 2 Controls for impeded and unimpeded incisors erupt 0.62mm/day and 1.00 mm/day respectively compared to 0.61mm/day and 0.95mm/day for lathyritic teeth when using Bryer's method of measurement compared to 0.57mm/day and 0.90mm/day for impeded and unimpeded controls of 0.47mm /day and 0.81mm/day for lathyritic teeth using metallic fixed implants respectively.

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