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INFLUENCE OF TOOTH STRUCTURE LESIONS ON EFFECTIVNESS OF DENTAL AGE ESTIMATION METHOD

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Summary : Method of Kvaal et al., which depends on proportions of specific measurements of tooth and pulp lengths and widths was approbated on 88 digital panoramic X-rays photos of patients with pathological attrition made by Planmeca PROMAX orthopantomograph on the base of Uzhhorod National University Dental Clinic. The mistakes that reaches 24±5,6 years were found during calculation of dental age using primary coefficients proposed by authors of technique. Also were found that the intensity of tertiary dentine deposition has linear regression depends on the pathology it is related to (bruxism, physiological issues, low level of mineralization, occlusal pathology caused by abnormal prosthetic treatment), which affect the result of age determination.

Key words : Age determination, radiographic technique, pathological attrition, regression analyses, dentine deposition.

Age is the least variable and mostprobablyaccurate in determiningindicator, since the agingprocessmostindependentlyreflected the changes of the pulp and hard tissues of the teeth compare toanyotherfunctionalsystems of the body that are more vulnerable to the effects of pathologies features, constitution and physiologicaldefects [1, 2, 3, 4, 10, 11, 13]. Kvaal et al. technique of age estimation involvescalculating ratio of length of crown and root to the length of the pulp, width of the root to the width of the pulp in specificallydesignatedlocations, searchof averages and the use of standardized coefficients for the final result [4, 5, 6, 7]. But whenabnormalocllusion, disfuntionalchewinghabiths, bruxism, abrasive factors or structural defects in teethtake place the intensity of toothagingaccelerates [3, 4, 11]. Formation of reparativetertiary dentine, closing volume of pulpchamber and dystrophyprocessestaking place in pulp structure whichis not usual for phisiological attrition. Due to all thesefactors and principlesweapprobateprimarymethod of Kvaal et al. age estimation among patients withpathological attrition.

OBJECTIVE

To evaluate specific changes of ratio measurements during approbation ofKvaal et al. age estimation technique in the conditions of pathological attrition .

MATERIALS AND METHODS

Based on randomized selection of panoramic x-rays photo of patients with pathological attrition of teeth were selected 88 of them (29 males and 59 females). All photos were made with Planmeca PROMAX orthopantomograph. All measurements were made using “Measurement tool” in Adobe Photoshop CS3 primary in pixels amount and then converted to millimeters and all the calculations were done due to the original Kvaal et al. algorithm of age estimation(T - maximum tooth length; R - root length; P - maximum pulp length; A - root and pulp width at cement-enamel junction; B - root and pulp width at one-quarter of the root length from the cement-enamel junction; C – root and pulp width midway between cement-enamel junction and root apex) [1, 5, 7, 8, 9] (fig.1). All ratios were calculated using standard Microsoft Office program package with a help of Microsoft Office Excel.

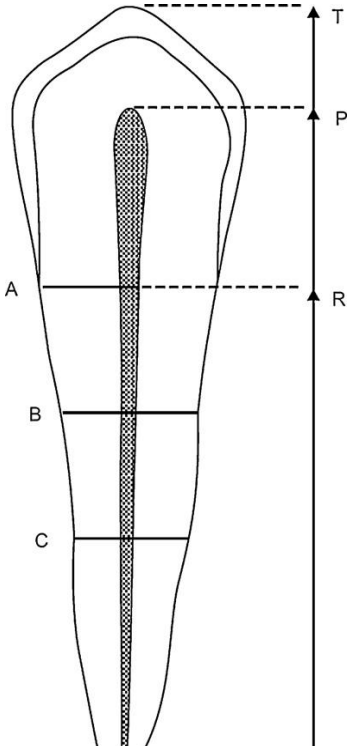

Figure 1. Specific indicators for Kvaal et al. age estimation technique

RESULTS AND DISSCUSSIONS

The most significant correlation between tooth and age result were found in upper(r=0,69) and lower (r=0,74) incisors, and lower premolar (r=0,72). The lowest correlation was found at lower canine in patients with pathological attrition (r=0,32). It could be explained because of level of influence of pathological attrition on different types of tooth. ThePearsoncorrelationcoefficientsbetweenchronologicalageandthedifferentratios (P, T, R, A, B, C – original for age estimation technique)calculatedbasedonlengthandwidth measurementsdirectlyontheorthopantomographsaredisplayedinTable 1

Table 1

Correlation between age of patients with pathological attrition and the ratios of measurements due to the original Kvaal et al. methold

	Upper central incisor	Upper lateral incisor	Upper second premolar	Lower lateral incisor	Lover canine	Lower first premolar
P	-0.11	-0.08	-0.16	-0.15	-0.07	-0.49
T	-0.34	-0.07	-0.11	-0.12	-0.16	-0.44
R	0.24	-0.14	-0.16	-0.12	-0.04	-0.28
A	-0.19	-0.30	-0.16	-0.22	-0.90	-0.10
B	-0.30	-0.20	-0.16	-0.32	-0.14	-0.20
C	-0.32	-0.30	-0.27	-0.31	-0.15	-0.20
M	-0.31	-0.26	-0.21	-0.34	-0.17	-0.39
L	-0.08	-0.11	-0.17	-0.27	-0.14	-0.23
W-L	-0.39	-0.14	-0.08	-0.30	-0.02	0.21

The differences compare to primary correlation are significant at R, L, W and A ratios. It can be explained by specific processes which occurs teeth during pathological attrition. Statistical difference of results in male and female groups was not significantly strong (p≥0,1).

Through our examination we found that the attrition caused by bruxism, abnormal occlusion because of disspositioned tooth and incorrect prosthetic treatment may cause proportional constant intense deposition of tertiary reparative dentine and lowering of occlusal surface relative to the time for which pathology occurs. However, pathology attrition because of abnormal tooth structures or abrasion

factors is not progression process during which pulp structures and hard tissues changes can be based on timeline, and level of changes occur different acceleration during different periods of time. Final results were ranged within level of mistake up to 24±5,6years.

CONCLUSIONS

DuringthisstudywereviewKvaal et al. age estimation technique on patients withpathological attrition and foundlevel of mistakeswhisreachesnearly 47-49%. Using component regressionanalysis and Pearson's coefficients wefoundcorrelationbetweenageresults and level of tooth surface attrition and deposition of tertiaryreparative dentine relative to the kind o pathologywhich cause the pathological attrition and the time whenpathologyoccurs. The stongestcorellationwasfoundbetween changes in incisors and lower first premolar. Changes in canine duringpathology attrition does not gravely affect the finish result.

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