LECTURE METHOD;
A PILOT STUDY ON COMPARING UNIVERSAL AND MICAP NOTATIONS.

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Article received on:
12/03/2018
Accepted for publication:
15/11/2018
Received after proof reading:
26/03/2019

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ABSTRACT… Background: Universal tooth numbering system is an old topic of oral anatomy course. MICAP is a new tooth notation but it is not yet in dental curriculum. **Aim:** To compare the learning of MICAP (new) vs Universal (old) tooth notations using lecture method. **Method: Designs:** A pre-test and post-test design. **Settings:** Islamic International Dental College – Islamabad. **Period:** October 2016 to February 2017. **Participants:** Novice undergraduate first year dental students (N=45) participated in the study. They were randomly divided into two groups. **Interventions:** MICAP and Universal tooth notations were taught to group A and B respectively by a 30 minute lecture prepared on power point slides in similar sequence. The study participants, before any intervention, completed fourteen randomly selected permanent teeth using Universal and MICAP notation method as pretest data and after eight weeks, posttest data were collected. Chi square test was applied for analysis. **Results:** The posttest showed an improved learning of two notations by both groups. Over all, no significant difference was found in correct write up of given set of fourteen teeth for two notations except 'Maxillary right central incisor, Mandibular left canine' and Mandibular Right 2nd Premolar ($p<0.05$). **Conclusion:** Learning of new (MICAP) notation was as easy as the old (Universal) numbering system. However, this was a small scale study and multiple teaching centers with larger number of participants are recommended.

**Key words:**   Lecture, MICAP, Tooth Notation, Universal Numbering System.

INTRODUCTION

Universal tooth notation[1] is taught in oral anatomy / oral biology course. This is more popular in North American dental schools as compared to Asian dental institutes. This system identifies permanent teeth by a series of numbers (1 to 32) for teeth present in permanent dentition. The numbers (1-8) represent teeth in the upper right quadrant where 3 means upper right 1st molar. The teeth of upper left quadrant are given numbers (9-16) where 9 shows upper left central incisor. Lower teeth are indicated by numbers starting from 17 to 32 and the former number represents lower left 3rd molar while later one indicates lower right 3rd molar. This system is digit based; hence it is quite easy to add in *e*-diagnostic charting system.

A new tooth notation 'MICAP' was developed a few years back for identification of teeth.[2] MICAP is based on first letters of names of tooth classes such as (M- molar, I- incisor, C-canine, P-premolar) and numbers which denote the tooth types of each tooth class. MICAP notation for complete permanent dentition is shown (Figure-1).

Maxillary permanent teeth
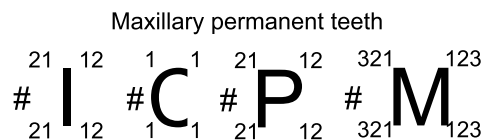
The letters I, C, P, M show the four tooth classes I- incisor, C- canine, P –premolar, M –molar. The numbers 123 indicate the relevant tooth types. For example #[123]M (Letter M indicates molar class and digits 123 show first, second and 3rd molar. Since the numbers are superscripted on the right side so they represent upper (maxillary) 1st, 2nd and 3rd molars. The numbers 123 are read separately such as first, second and third rather

than one twenty three.

MICAP tooth notation presents all four tooth classes using letters (I, C, P and M) and their relevant types are indicated by digits (1, 2, 3). The digits allocated for central and lateral incisor are 1, 2 respectively. Once these digits are written as superscript, they show maxillary (upper) incisors teeth and when subscripted digits 1, 2 on letter #I indicate mandibular (lower) incisors.

An interactive lecture is a uniform and systemic oral presentation of facts with orderly organized thoughts and ideas. It is the one of the time worn teaching methods and remains the most common if not the most well-liked in many dental schools.[3,4] This is more likely one way information therefore lecturer should take extraordinary efforts to familiarize the students problems and their understanding of contents without oral feedback. Attendance of lecture was encouraged for dental students to achieve grades.[5]

This study aimed to compare the cognitive understanding of MICAP notation (new topic) in relation to Universal tooth notation which is very old notation. The study was approved by the institutional ethics committee of Islamic International Dental College, Islamabad.

METHODS

Design and Settings
This was a pretest and posttest trial. First-year undergraduate students (N= 60) of Islamic international dental college, Islamabad, were chosen as convenience subjects who were divided randomly into two groups with the equal number of students. Group A had a lecture on MICAP tooth notation while group B was taught Universal tooth notation by lecture also. This study was conducted from October 2016 to February 2017.

In Pakistan, before entering the dental school, there is no teaching of tooth notation. They are taught this topic in oral anatomy course in year 1, more likely after two modules of basic medical sciences. Therefore novice first year students were selected to make the groups equal in terms of knowledge of tooth notation.

Intervention
Two separate lectures each of thirty minutes duration having a similar sequence of contents on Universal and MICAP tooth notation were delivered simultaneously at two different locations by two different but having similar teaching experienced dental faculty members. The contents of two tooth notation were checked by a third faculty member as a blind reviewer.

Before delivering the lecture to groups A & B, pretest data were obtained from the two groups using randomly selected fourteen permanent teeth to be written in Universal as well as MICAP format. An example of each format was provided for this purpose.

After eight weeks of the intervention posttest data for MICAP and Universal notations were obtained using the same questionnaire. However, students were neither informed about the post test data nor to study at home.

Study instrument had fourteen permanent teeth which were shown as virtual patients with dental problems involving each tooth class. Each selected permanent tooth was given correct =1 and incorrect =0 to calculate the scoring of learning. Thus each subject had maximum score of fourteen for each set of data. Only data of those students were added in SPSS version 23.0 who attended the two sessions. Chi square test was applied to analyze any differences in the scores for each tooth between the two groups. Frequencies and percentages were calculated for each tooth separately. Odds ratios and 95% confidence intervals were reported for the differences between identification of Universal and MICAP tooth notations.

RESULTS
A total of students [(N= 45, Group A (n=23), B (n=22)] out of 60, comprising of male (n= 13, 28.3%) and female (n= 32, 71.8%) completed four sessions (two sessions per each notation). Fifteen students didn't attend the sessions of

pretest and posttest of either MICAP or Universal tooth notation. Pretest results showed that they had zero knowledge of MICAP as well as Universal tooth notation.

Posttest showed an improved learning of group A and B who were taught MICAP and Universal notation by lecture method. Over all, no significant difference was found in correct write up of given in set of fourteen teeth for two notations except 'Maxillary right central incisor, Mandibular left canine' and Mandibular Right 2nd Premolar ($p < 0.05$). The posttest results are illustrated in

(Table-I).

DISCUSSION

This study explores the conceptual understanding of two tooth notations by novice dental students who learn Universal notation in the oral biology module more likely in the early phase of the 2nd year. It was a challenging situation to measure the conceptual understanding of two notations by students who must have no baseline knowledge associated with relevant notations. Fresh first-year dental students were waited to accomplish this project.

Comparison of learning of MICAP vs Universal tooth notations (N=45)									
Tooth	MICAP Tooth Notation (n =23)				Universal Numbering System (n=22)		X^2 (df)	OR (95% CI)	P-value
	**Cor n (%)	*Incor n (%)	Format MICAP vs Universal		**Cor n (%)	*Incor n (%)			
Maxillary Right Central Incisor	16 (69.6)	7 (30.4)	#^{1}I	#8	21 (95.5)	1 (4.5)	1	9.2 (1.02 – 82.4)	0.047
Mandibular Left Canine	16 (69.6)	7 (30.4)	#C$_1$	#11	22 (100.0)	0 (0.0)	1	0.7 (0.5 – 0.9)	0.009
Maxillary Right 1st Molar	16 (69.6)	7 (30.4)	#^{1}M	#3	20 (90.9)	2 (9.1)	1	0.2 (0.04 – 1.26)	0.14
Mandibular Right 2nd Premolar	13 (56.5)	10 (43.5)	#$_2$P	#29	19 (86.4)	3 (13.6)	1	0.12 (0.03 – 0.53)	0.003
Mandibular Right Lateral Incisor	15 (65.2)	8 (34.8)	#$_2$I	#26	10 (45.5)	12 (54.5)	1	0.4 (0.13 – 1.5)	0.18
Mandibular Right 1st Molar	12 (52.2)	11 (47.8)	#$_1$M	#30	11 (50.0)	11 (50.0)	1	1.1 (0.34 – 3.5)	0.88
Maxillary Left Canine	17 (73.9)	6 (26.1)	#C^1	#11	16 (72.7)	6 (27.3)	1	0.94 (0.25 – 3.53)	0.93
Maxillary Left 3rd Molar	15 (65.2)	8 (34.8)	#M^3	#16	18 (81.8)	4 (18.2)	1	2.4 (0.60 – 9.56)	0.21
Mandibular Right Central Incisor	15 (65.2)	8 (34.8)	#$_1$I	#25	16 (72.7)	6 (27.3)	1	1.4 (0.4 – 5.1)	0.59
Maxillary Left Lateral Incisor	15 (65.2)	8 (34.8)	#I^2	#10	21 (95.5)	1 (4.5)	1	11.2 (1.26–99.27)	0.022
Maxillary Right 2nd Premolar	17 (73.9)	6 (26.1)	#^{2}P	#4	18 (81.8)	4 (18.2)	1	1.59 (0.38 – 6.63)	0.72
Maxillary Right Canine	17 (73.9)	6 (26.1)	#^{1}C	#6	19 (86.4)	3 (13.6)	1	2.24 (0.48–10.35)	0.46
Maxillary Left 1st Molar	17 (73.9)	6 (26.1)	#M^1	#14	16 (72.7)	6 (27.3)	1	0.94 (0.25 – 3.53)	0.93
Maxillary Right 2nd Molar	15 (65.2)	8 (34.8)	#^{2}M	#2	16 (72.7)	6 (27.3)	1	1.42 (0.4 – 5.07)	0.59
*Chi Square Test. **Correct, *Incorrect Majority of students were able to write specific format of MICAP as well as Universal notation accurately.									

Tooth notation is a baseline for diagnosis. A limited data could be retrieved on assessment of various tooth notations including the newly introduced MICAP notation.[6-8] Lecture is an effective teaching tool to transform knowledge to the students. In this study, students improved their learning from zero to almost a hundred percent at a few tooth classes aspect of the topic. This provided an evidence lecture to be an effective tool.[9] However, it is strongly argued that learners may get bored by this method.[10] Simplicity or complexity of the topic may play a role in this manner. But MICAP format has been found to be simple notation which requires little care to understand its components.[11]

Universal notation comprises of digits from 1-32 for permanent teeth in a sequence while MICAP uses letters and digits. For example, upper right first molar is indicated by #[1]M, letter (M) and digit (1) show the first molar. Since #1 is superscripted on the right side of the letter 'M' so it is an upper right first molar. Recently revised oral anatomy curriculum at the Islamic international dental college of Riphah international university integrates independent lectures with problem-based learning in addition to seminar and simulated teaching. This module provides a fundamental concept because it deals with teeth. More emphasis is placed on the early acquisition of psychomotor skills with enhanced conceptual components. This study provided knowledge of tooth notations to participants ahead of the start of the module. Both notations are easier to learn equally. It contributed to further validation of new topic (MICAP) of oral anatomy course. Previously FDI tooth notation was compared and its results were similar to this study.[13] Furthermore, this study provided evidence of learning of topic 'MICAP' notation by interactive lecture method. After eight weeks, students provided the information what they gained by interactive lecture. In fact, lecture method is another suitable and preferred format to make effective and easier understanding of oral anatomy topics such as MICAP and Universal notation.[12]

Multiple tooth notations are employed in different universities and public dental hospitals and there is a dearth of standard international dental charting system.[13,14] In spite of dearth of standard international dental charting system and there are. The different tooth notation systems, symbols, and abbreviations are used by the preference of the individual dentist.[15,16] The diversity of tooth notation systems has led to errors in the practical transcription of anamnesis and clinical information especially wrong tooth numbering in referral letter.[17]Unclear notation, mixed dentition and missing molar tooth are known risk factors for malpractice other than incorrect patient identification and involvement of several surgeons in one procedure. Using standard terminologies is a possible solution because these terminologies are constant in medical and other allied health science programmes.

Many general dentists and specialists use different tooth notations when communicating with each other.[18] MICAP is a step towards making it a global system because it is based on the name of tooth classes (I-incisor, C-canine, P-premolar, M-molar) which are standard in all dental and medical curricula. The previous study on learning of MICAP format by dental, medical and forensic students was an indication of its prospective use as a global system.[11]

CONCLUSION
Tooth notation is a basic topic associated with an oral diagnostic procedure. Students are taught various tooth methods and each tooth notation has its own specific format to identify teeth. The Universal method is based on numbers while contour of MICAP notation is based on first letters of tooth classes. It is evident from the results that the format of MICAP is as straight and simple as Universal notation. However, this study was done on small scale and may not reflect the global scenario about the understanding of new notation and its clinical application. Therefore further studies are likely recommended in future.
Conflict of interest: Authors declare no conflict of interest
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2	Anum Zehra Khan	Data collection and assisted in analysis.	
3	Rehmatullah Khan	Initial manuscript, Write up.	
4	Saqlain Bin Syed Gilani	Data collection and entry in SPSS	
5	Faisal Shafiq Malik	Data collection and entry in SPSS	
6	Ashfaq Akram	Study concept and final critical review of manuscript.	