

### Course title

Morphometry in dental anthropology

### Department

Department of Dental Anthropology

### Address

Gundulićeva 5, Zagreb

### Total ECTS points

3

### Course leader

Associate professor Jelena Dumančić

### Course associates

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### Teaching plan

	No. classes
Lectures	4
Seminars	5
Practicals	6
Total	15

1 class = 45 minutes

### Course description

The purpose of the course is to introduce students to the methods of morphometry and their application in dental anthropology and forensic dentistry.

Human dentition has a number of specific features that make it an excellent system for testing hypotheses about individual development and population changes over time and in a particular geographical area.

Tooth morphology is an element of human dentition that is largely a reflection of the genetic background and to a lesser extent a reflection of environmental influences. It includes metric and non-metric variations, ie variations in size and shape of tooth crowns and roots. At the histological level, variations relate to the thickness of specific dental tissues. Variations in dental development relate to the order of eruption and chronology of development.

Variations are a reflection of evolutionary changes, and in living populations there is a pattern of geographical variations and variations that occur as a result of chromosomal and genetic abnormalities. Sexual dimorphism includes differences in the dentition of men and women, which are conditioned by sex chromosomes X and Y. After eruption, teeth are exposed to the environment and intentional and unintentional dental modifications occur, including tooth wear and pathology. Thanks to geographical differences in dental variables (continental, regional and local) we can draw conclusions about the history and ethnicity of a particular population. Dental morphometry is used in forensic dentistry, to determine age, gender and ethnicity. In addition to living populations, these methods are applicable to fossil hominids and human skeletal populations.

**Learning outcomes**

1. analyze the morphological variations of teeth using the Arizona State University Dentoanthropological System
2. assess the ethnic origin of an individual based on morphological variations of teeth
3. analyze the characteristics of teeth that show sexual dimorphism
4. evaluate the biological profile of an individual by evaluating dentoanthropological parameters
5. create research and establish dentoanthropological parameters on a population sample

**Course content**

## Lectures

	<b>Lecture topics</b>	<b>Number of classes/hours</b>
1.	The Arizona State University Dentoanthropological System (ASUDAS) and dental morphometric variation between populations	2
2.	Influence of the sex chromosomes genes on dental and craniofacial development	1
3.	Sex dimorphism in human dentition	1
4.	-	-
5.	-	-
6.	-	-
7.	-	-
8.	-	-
9.	-	-
10.	-	-

1 class = 45 minutes

## Seminars

	<b>Seminar topics</b>	<b>Number of classes/hours</b>
1.	Odontometrics	1
2.	Genetic, epigenetic and environment influence on human dentition	1
3.	Dental modifications	1
4.	Dental wear	1
5.	New methods in morphometry: virtual 2D and 3D analysis	1
6.	-	-
7.	-	-
8.	-	-

9.	-	-
10.	-	-

1 class = 45 minutes

#### Practicals

	Practicals topics	Number of classes/hours
1.	Analysis of nonmetric variation of tooth crown and root morphology using the Arizona State University Dentoanthropological System (ASUDAS)	2
2.	Odontometrics and gnatometric analysis	2
3.	Radiological dental morphometry: analysis of number, size and morphology of tooth crowns (histological components) and roots, with measurement of taurodontism, on dental radiographs and CBCT scans	2
4.	-	-
5.	-	-
6.	-	-
7.	-	-
8.	-	-
9.	-	-
10.	-	-

1 class = 45 minutes

#### Literature

1. Scott GR, Irish JD. Human tooth crown and root morphology: the Arizona State University Dental Anthropology System. Cambridge: Cambridge University Press; 2017. 332 p.
2. Scott GR, Turner CG II, Townsend GC, Martínón-Torres M. The Anthropology of Modern Human Teeth. Dental Morphology and its Variation in Recent and Fossil Homo sapiens. 2nd ed. Cambridge: Cambridge University Press; 2018. 396 p.
3. Brkić H, Dumančić J, Vodanović M, eds. Biology and morphology of human teeth. Jastrebarsko: Naklada Slap; 2021. 268 p.
4. Irish JD, Scott GR, eds. A companion to dental anthropology. Chichester: Wiley Blackwell; 2016. 540 p.
5. Scott GR, Turner CG. The anthropology of modern human teeth: dental morphology and its variation in recent human populations. Cambridge: Cambridge University Press. 1997. 382 p.
6. Maier C, Dumančić J, Brkić H, Kaić Z, Savić Pavičini I, Poje Z, Scott GR. Tooth Crown Morphology in Turner and Klinefelter Syndrome Individuals from a Croatian Sample. Acta stomatol Croat. 2019;53(2):106-118. DOI: 10.15644/asc53/2/2

7. Scott GR, Pilloud MA, Navega D, Coelho JO, Cunha E, Irish JD. rASUDAS: A New Web-Based Application for Estimating Ancestry from Tooth Morphology. *Forensic Anthropology*. 2018;1(1):18–31. DOI 10.5744/fa.2018.0003
8. Vodanović M, Zukanović A, Galić I, Harvey L, Savić Pavičin I, Dumančić J, Bedić Ž, Njemirovskij V, Šlaus M, Brkić H. Carabelli's trait in Croatian populations over 1800 years. *Homo*. 2013 Aug;64(4):273-85. doi: 10.1016/j.jchb.2013.04.001. Epub 2013 May 10.
9. Dumančić J, Kaić Z, Petrovečki M. Evaluation of Taurodontism in Krapina Neanderthals. U: Brook A, ed. *Dental Morphology 2001. Refereed full papers from 12th International Symposium on Dental Morphology*, Sheffield, United Kingdom. Sheffield Academic Press Ltd; 2001. p. 111-21.
10. Macchiarelli R, Bondioli L, Mazurier A. Virtual dentitions: touching the hidden evidence. In: Irish JD, Nelson GC, eds. *Technique and Application in Dental Anthropology*. New York: Cambridge University Press; 2008:pp 426-448.
11. Kieser JA, Becker PJ. Correlations of dimensional and discrete dental traits in the post-canine and anterior dental segments. *J Dent Assoc S Afr*. 1989;44:101-3.
12. Scott RG. The Eskimo-Aleut Dentition: Crown and Root Morphology. *Acta Stomatol Croat*. 2020 Jun;54(2):194-207. doi: 10.15644/asc54/2/10. PMID: 32801379.

### **CV (*curriculum vitae*) and bibliography of course leader**

Jelena Dumančić was born in Zagreb, where she completed primary and secondary education. She enrolled at the School of Dental Medicine, University of Zagreb, in 1990, and graduated in 1995 with the topic "Age determination by dentoanthropological parameters".

She has been working at the Department of Dental Anthropology, School of Dental Medicine, University of Zagreb since June 3, 1996. She earned her master's degree in 2000 with the topic "Gonadal dysgenesis and characteristics of teeth" and her PhD in 2005 with the topic "Characteristics of the craniofacial complex in Turner syndrome". She specialized in family dentistry. She was elected associate professor on February 6, 2017. In the integrated study program, she is the head of the elective course History of dental medicine, and teaches in courses Tooth morphology with dental anthropology, Forensic dental medicine, Ethics and Social medicine and epidemiology. In 2019, she introduced a new elective course Oral health care for persons with disabilities.

Her research and professional work is focused on dental anthropology, forensic dentistry, history of dentistry, family dentistry and dental care for people with disabilities. Since 2013, she has been the leader of continuing education courses in the field of family dentistry. In 2010, she completed an IOFOS forensic dentistry course in Oslo, Norway. In 2014, she received an Erasmus+ grant for training in dental care for people with disabilities and the elderly at the Karolinska Institute in Sweden. From 2014 to 2018, she was the leader of the "Project for oral health promotion in blind and visually impaired persons", implemented with the support of the Zagreb City Office for Health and the University of Zagreb.

She actively participates in international congresses and has won three international awards for congress presentations. In addition to numerous scientific and professional papers, she is the co-author of six university textbooks, two monographs, a manual and a dictionary, and the author and co-author of two scripts for graduate and postgraduate teaching.

In 2016 she initiated the international Dental Anthropology Scientific Symposium (DASS Zagreb 2016) on the occasion of the 50th anniversary of the Department of Dental Anthropology, for which she received an award plaque by the School of Dental Medicine.

She is a member of the Working Group for Prevention and Promotion of Oral Health Protection at the Ministry of Health. She is actively working on promotion of oral health in the wider community, especially in children and people with disabilities. She initiated the first organized student volunteering at the School of Dental Medicine, on the Project for oral health promotion in blind and visually impaired persons. She is married and the mother of three daughters.

Bibliography available at: <https://www.bib.irb.hr/pregled/profil/16439>