The Usefulness of Panoramic Radiography in Human Identification

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Introduction

Causes of mass disaster

- Increase in transportation means

- Group residence in large scale

- Wars and terrors

Necessity of
Individual identification

- Humanitarianismic matter

- Solution for legal and social problems

- Honorable treatment to
  a national man of merit

Methods of individual identification

- Identification with naked eye
- Spot investigation and investigation with dressings and belongings
- Fingerprint examination
- Anatomical, anthropological examination
- Forensic radiological examination
- Forensic pathological examination
- Forensic serological examination
- Forensic odontological examination
- Superimposition
- Reconstruction of facial features
- Genetic examination

Why forensic odontology in Individual identification

- The hardest tissue of human organs
  - Composed of enamel, dentin, cementum
  - High physical, chemical tolerance
- Estimation of sex and age
- Blood type and genetic examination
- Anatomical characteristic + dental characteristic

  ⟹ Important role in Individual Identification at mass disaster

Characteristic of
Panoramic radiography

- Generally taken in dental clinic

- Upper and lower teeth shown in one
  film

- Facilitate maintenance of data

Purpose

- In advanced countries, panoramic datas are collected and used in individual identification. However, this is not the case in Korea.

- The purpose of this study is to evaluate the usefulness of Panoramic radiography in individual identification by classifying dental characteristics shown in it, and furthermore, apply it in developing individual identification program using dental characteristics

Materials and Methods

 300 panoramic radiographies of patients, who visitied Dental hospital, Yonsei University, were selected randomly. Dental characteristics were classified into 8 types and transformed into codes for evaluation of diversity of them on panoramic radiography

Dental characteristics and codes in Panoramic Radiography

- V (Virgin tooth)

  No evidence of dental disease, treatment or anatomical abnormality
- X (Missing tooth)

  Extracted or congenital missing tooth
- I (Impacted tooth)

  Unerupted or impacted tooth
- D (Defect)

  Defect by dental caries, tooth fracture, filling body fallen out

- R (Residual root rest)

  Root rest remained by severe dental caries
- T (Root canal treatment)

  Root canal treatment and canal filling
- F (Filling)

  Filling : Cavity should be entered also

    F(M) : mesial

    F(O) : middle

    F(D) : distal
- P (Prosthesis)

  Crown and bridge

The example of panoramic radiography

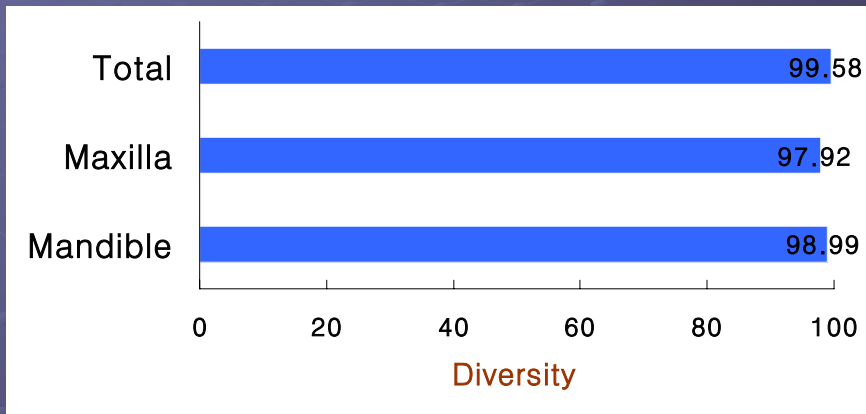# Corresponding codes of dental characteristics

18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
V	R	R	V	V	V	V	P	XP	P	V	T F	V	F (O)	F	V

48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
D	D	D	V	V	V	V	V	V	V	V	V	V	X	X	X

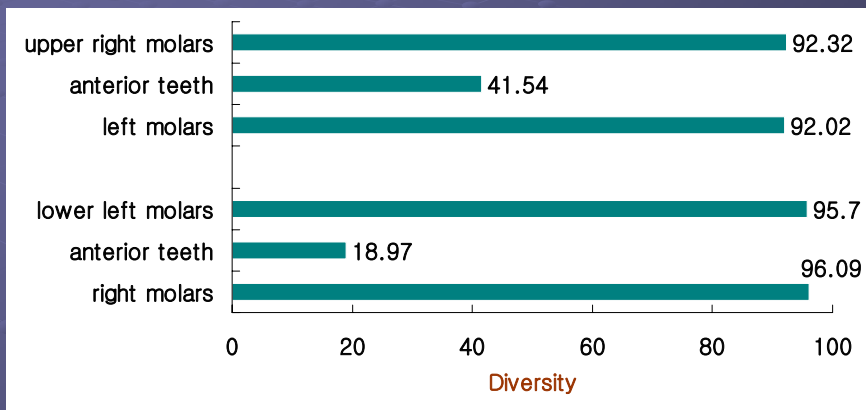## Formula for evaluation of Diversity

$$h = \frac{n(1 - \sum x^2)}{(n-1)} \quad (x : \text{frequencies of dental characteristic})$$

Results

Diversity of dental characteristics in Panoramic radiography

Diversity respective to Location of teeth

Conclusion

1. Diversity of panoramic radiography using the whole teeth was 99.58%

2. Diversity using lower teeth (98.99%) was found to be higher than that of upper teeth (97.92%).

3. Diversity according to location of tooth was in the order of right molars (92.32%), left molars (92.02%), anterior teeth (41.54%) in maxilla while that of mandible was in the order of right molars (96.09%), left molars (95.70%), and anterior teeth (18.97%).

Therefore, panoramic radiography is useful in individual identification not only with the presence of the whole teeth but also with the presence of molars only. It is also expected to be applicable practically in identifying victims of mass disasters as well as wars.