# Measurement of lower canine clinical crown index in male and female for gender identification

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## ABSTRACT

The purpose of this research was to acquire the value index of clinical crown lower jaw canine male and female, and to prove whether the index of male's canine is bigger than female's. The samples of the research was the students of Faculty of Dentistry Universitas Padjadjaran class of 1998 until 2001 by using proportional random sampling method according to the criteria and also adjust with the numbers of male and female composition in per class. The characteristic of the research was analytical descriptive with survey technique. The result of t test statistic measurement was that index of clinical crown lower jaw canine of male was 1.50 and female was 1.21, by using reliance 95%. The inference of the research showed that the index of clinical crown lower jaw canine of male was significantly bigger than female's. The result of the research can be used as auxiliary data from the techniques to process gender identification in odontology forensic.

**Key words:** Odontology forensic, gender identification, lower canine clinical crown index

## INTRODUCTION

Forensic dentistry is a branch of dentistry that study human teeth for the interest of justice. Justice here does not necessarily related to a court as an institution but also include justice in a broader manner.[1]

The need for forensic dentistry support has increased recently especially with the more criminals trying to eliminate the victim's identity and with more accident cases that cause the body of the victim to be damaged. In these cases, the role of teeth as the identification tool becomes bigger because teeth have a very individual nature and survive longer because they do not affected by decay.[2] In addition, victim identification is an important stage because with the identification,

the investigation can be narrowed and more targeted.[3]

In dealing with unidentified dead body, the forensic experts recognize several way of human identification starting from visual identification, clothes identification, document identification, jewelry identification, medical identification, serological identification, finger print identification and exclusion.[2,3] Most of the above identification methods are difficult to be performed when the victim's body is already decayed. In that situation, the teeth can be expected to be used as identification tool.[1]

Tooth is a hardest part of the human body because its composition only consists of a minimum amount of organic materials making it resistant to decay. Therefore, in human or ancient

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animal remnant, in addition to the bone, the teeth contribute as the longest survived body remnants that can survive for thousands years.[4]

In addition to the tooth ability to survive decay, the tooth also have a relatively high resistance towards temperature challenge. In several fire disaster, it is often found that even though the other body parts are severely damaged by the fire, the teeth are often found undisturbed. This is due to the tooth resistance to high temperature and also its location in the mouth that is protected by lips and cheek and is always in wet condition. Due to its nature that is resistance to various influences that tend to damage human body, the tooth is used as one of the part for forensic analysis, especially for identification need.[2,3]

The value of the teeth as the identification tool is supported by its very specific nature meaning that it has individualistic nature for each people. The dental and supporting tissue arrangement in a human being is never identical with the dental and supporting tissue arrangement in another human being. As a simple example, a removable prosthetic belongs to one elderly will not fit in other people's mouth.[5]

The information that can be expected for identification purpose includes dental characteristic, gender, age, habit/occupation, social status, blood type, race and DNA.[2,6] These can help the officer that identifies the victim to target its search into a narrow search. For example, if the gender is known as female, then the officer does not have to look for a male victim. This already narrowed the search for more or less 50%. Moreover when the age, blood type and other characteristics are found then the search will become more targeted.

Not only race but also gender gives different character on human's body between male and female. Besides sexual signs that appear in human's soft tissues, hard tissues also possess those signs which can be found in their size and form.

In determining gender, teeth have a very high discrimination value and they are one of the means that can be used in determining gender by the differences in size and form of canines teeth of lower jaw. Canines teeth of lower jaw in male are bigger than those in female, so that those differences can add some information in identifying unknown body in forensic field.

Based on the explanation above and the importance of noticing teeth size and form in forensic dentistry, the writer was interested in observing clinical crown index of canines teeth of lower jaw in male and female, that is cervicoinsisal divided by mesiodistal size.

## MATERIALS AND METHODS

This study was an analytical descriptive study using survey technique. The sampling was done using proportional random sampling method based on certain criteria. The population was the students of Faculty of Dentistry Universitas Padjadjaran bachelor program that met the following criteria: perfectly erupted lower canine; no congenital or hereditary defect found; normal canine surrounding soft tissue; never or not in conservation, endodontic, prosthodontic, or orthodontic treatment; not worn, caries or fractured in one of the region. The sample was collected randomly from 10% of the population number that met the criteria, which is 10% of 447, i.e. 45 people consists of 10 male students and 35 female students that represent all grades proportionally.

The sampled students who met the criteria were asked to fill in informed consent for showing consent for participating in this study. Then an impression of the lower jaw was made using alginate impression materials and partial impression tray. The negative impression was then poured by stone plaster (moldano). The hardened model was then removed from the impression material that positive impression was gained.

The measurement of lower canine permanent crown morphological dimension was conducted using sharp ended caliper with an accuracy scale of 0.05 mm. The cervicoincisal measurement was performed to the clinical crown which is a part of crown that is not covered by epithelial and is prominent in the oral cavity (non permanent).[9] The sharp end of the caliper was placed on the cervix with the other end placed on the incisal part of the teeth. For mesiodistal measurement, the sharp end of the caliper is placed on the biggest mesial and distal diameter of the dental crown that is at the dental contact point of the normal dental position. In the malpositioned tooth, the measurement was performed at the

mesiodistal part of the crown to be able to represent the proximal contact with the neighboring tooth.

To gain accurate data, reliability test for the measurement was performed. The measurement was performed in three consecutive rows which was then averaged to get the data value. The result of the measurement was listed in a table and the index of the lower canine clinical crown was calculated by dividing the cervicoincisal value with the mesiodistal value. After that, the average value was calculated and t test was conducted.

The statistical analysis method that is used in this study is the similarity of two means, which is the right one way test. The cervicoincisal measurement data were divided by the mesiodistal data and then grouped according to gender and the average value, combined average value, standard deviation value, and combined standard deviation value were calculated. The test for similarity of two means was then performed using t-student statistical test.

## RESULT

### Average cervicoincisal measure of lower canine clinical crown in students

From the result of the measurement, it was learned that the average cervicoincisal size of lower canine clinical crown for male and female Faculty of Dentistry Universitas Padjadjaran students was as follows: Average cervicoincisal size of lower canine clinical crown of male student was 1.015 mm with a standard deviation of 0.109; Average cervicoincisal size of lower canine clinical crown in female students was 0.87 mm with a standard deviation of 0.086.

Furthermore, a calculation of two mean similarity test, which was the one way right side test with a confidence level of 95% ($\alpha$=0.05) was performed. From the results it was gained that the calculated t of 4.44 was higher than the table t 1.6775 so that it was not in the area of $H_0$ accepted. Therefore, $H_0$ was rejected and $H_1$ is accepted. This means that statistically, with a confidence level of 95%, the cervicoincisal size of the lower canine clinical crown in male was significantly bigger than female.

### Average mesiodistal measure of lower canine clinical crown

From the measurement results, it was learned that the average mesiodistal size of lower canine clinical crown of male and female Faculty of Dentistry Universitas Padjadjaran students was as follows: Average mesiodistal size of lower canine clinical crown of male student was 0.677 mm with a standard deviation of 0.058; Average mesiodistal size of lower canine clinical crown in female students was 0.72 mm with a standard deviation of 0.070. Furthermore, a calculation of two mean similarity test, which was the one way right side test with a confidence level of 95% ($\alpha$=0.05) was performed. From the results it was gained that the calculated t of -1.9 was lower than the table t 1.6775 so that it was in the area of $H_0$ accepted. Therefore, $H_0$ was accepted and $H_1$ was rejected. This means that statistically, with a confidence level of 95%, there was no significant difference in mesiodistal size of the lower canine clinical crown in male and female students.

### Lower canine clinical crown index value in male and female students

From the calculation of the data result, it was learned that the average index value of lower canine clinical crown of male and female students was as follows: Average index value of lower canine clinical crown of male student was 1.50 with a standard deviation of 0.104; Average index value of lower canine clinical crown in female students was 1.21 with a standard deviation of 0.142. It can be seen that the index value of lower canine clinical crown of the male students was 1.50 with a standard deviation of 0.104 while in female students the value was 1.21 with a standard deviation of 0.142. After the data above were collected, a two mean similarity test, which is the right side test, in a confidence level of 95% ($\alpha$=0.05) was performed.

It can be seen that with a confidence level of 95%, it was gained that the calculated t of 5.96 is bigger than t table (1.6775) so that the result was significant. Therefore, it can be stated that from the result that there was a very significant difference of lower canine clinical crown index value between male and female. It means that the

statistical test result showed a calculated t was bigger than the Table t.

## DISCUSSION

Based on the statistical calculation, it is revealed that the male cervicoincisal size of lower canine clinical crown is significantly bigger than the female size and the mesiodistal size does not differ significantly between male and female. Therefore, the lower canine clinical crown index in male is bigger than the index in female. This value is in accordance with Quendangen[1] study that stated the cervicoincisal size divided by mesiodistal size of lower canine in male is bigger (more or less 1.5 times) compared to female (more or less 1).

With the presence of a quite big overlapping area in this cervicoincisal and mesiodistal size, it will be difficult to use it for gender identification. Meanwhile for identification using cervicoincisal or mesiodistal only cannot be used for the main data in identifying gender in unidentified body.

Furthermore, with this index value, it can be concluded that the form of lower canine crown of man is sharper than that in female. This is due to the long cervicoincisal size of men that the lower canine crown of man is sharper. In female, the mesiodistal size of lower canine is bigger that the crown is more rounded. Therefore, the index value of lower canine clinical crown can be used as the reference and supporting data for identifying gender in unidentified body.

## CONCLUSION

Based on the study, it can be concluded that the index value of lower canine clinical crown can be useful in identifying someone's gender especially when the body is already decayed

that the tooth is the only thing that can be used for identification. The determination of gender through teeth is used as additional data because in identifying a person, we should not only use one method.

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