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## Letter to the Editor

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<td>Dr. Shashidhar. C. Mestri.</td>
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</table>
Dear colleagues,

Greetings from Manipal.

The XXII Annual State Conference of Karnataka Medico-legal Society —KAMLS CON - 2014 is being conducted in —Kundanagari i.e. Belagavi. I welcome you all to this Sweet city of North Karnataka.

It gives me immense pleasure to hand over the Second issue of JKAMLS 2014, a conference issue. This issue is filled with important scientific research articles as well as case reports which will definitely add knowledge to our existing understandings about many issues. The contributions from the authors and editorial board members are worth appreciating in bringing out this conference issue.

Day by day the awareness among the faculty members regarding scientific publications is increasing which is a good sign as far as Forensic Medicine is concerned. I feel happy to receive articles not only from both senior and junior faculty but also from postgraduates in Forensic Medicine.

It is important to adhere to the publications guidelines while considering scientific publications especially by junior faculty who are not much experienced in the field. This helps them to avoid ethical conflicts and legal complications arising out of unscrupulous practice. The originality of the research, maintaining the confidentiality of subjects involved in the research, prior obtained self-explaining complete informed consent, carefully employed easily reproducible and unbiased methods while collecting data, statistically derived sample size and use of appropriate statistical methods to obtain significant results are very much essential for any scientific research.

Another important aspect of ethical publication is avoiding ‘Plagiarism’. It is an act of using or closely reproducing the language and thoughts of other authors without permission or crediting the original authors and the representation of that author's work as one's own. More prevalent practice of cut, copy and paste among budding research fellows leads to more and more such incidences. Plagiarism is considered academic dishonesty and a breach of publication ethics. Though it is not a crime per se, it is considered as a serious ethical offence. It can lead to sanctions like penalties, suspension, and even expulsion.

So let us all pledge to follow the ethical route…………..

Dr Shankar M Bakkannavar
Editor – in – Chief
Original Communication

**Middle Finger Length - a Tool for Stature Estimation**

Pramod Kumar GN¹, YP Raghavendra Babu², Madhu B³, Prateek Rastogi², Roopa Urs A.N⁴, Balaraj BM⁵

**Abstract**

The estimation of stature from skeletal remains is one of the basic requirements and is extensively studied specifically from long bones. However, stature estimation from fragments of skeletal or body remains is a tedious process and needs to be researched. The present study attempts to determine the stature from middle finger length. Length of middle finger was measured from 200 individuals (100 males & 100 females) belonging to Mysore district, Karnataka, India aged between 21 and 30 years. Measurements of middle finger length (MFL) were recorded using a vernier caliper and the individual height (stature) was recorded using an anthropometric rod and the data was subjected for statistical analysis using SPSS software. Mean stature was significantly higher in males than females. Mean MFL on right and left sides respectively was 9.79 cm and 9.74 cm in males and 9.22 cm and 9.21 cm in females. MFL was larger in males than females in both hands. Statistically significant correlation was observed between stature and middle finger length of both hands. Pearson correlation (r) for stature and finger lengths was higher among females than males. Independent linear regression equations to calculate the height was formulated in males & females separately.

**Key words:** Anthropometer; middle finger length; stature; identification

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**Introduction**

Stature is considered as one of the primary data for identification. The stature prediction occupies relatively a central position in the identification necessitated by the medicolegal experts or medical jurisprudence and also in the anthropological research. When a complete dead body is found, stature determination is rather an easy task; but in cases where only parts of the body are available, the determination of stature of the individual becomes difficult.¹ Estimation of stature of an individual from the skeletal remains or from mutilated or amputated limbs or from parts of limbs has obvious significance in the personal identification in the event of alleged homicide, accidents or natural disasters, mainly concerned with the forensic identification analysis.

The retrieval of mutilated remains is not uncommon, because many a times the bodies are mutilated with the intention of either concealing the identity of the deceased after committing a crime or to facilitate the disposal of dead. In some circumstances fragmentary remains may also be recovered from forests or lonely places mutilated by wild animals.² The need to develop methods to construct stature from various bones has been stressed by many workers due to its application in forensic medicine, in medicolegal enquiries and in identifying war or mass disaster casualties.

Till date, most of the workers on stature estimation have used the length of long bones such as femur, tibia, humerus, radius, etc.³ Very little data is available on previous

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¹Associate Professor, Dept. of Forensic Medicine & Toxicology, MGMC&RI, Pillayarkuppam, Pondicherry, India. ²Associate Professor, Dept of Forensic Medicine & Toxicology, Kasturba Medical College, Mangalore, Manipal University, India. ³Assistant Professor, Dept of Community Medicine. ⁴Postgraduate Trainee cum Tutor, Department of Pathology & ⁵Professor, Department of Forensic Medicine and Toxicology, JSSMC, JSS University, Mysore India.  
**Correspondence:** Dr YP Raghavendra Babu; Email id: raghavendra.babu@manipal.edu
work done for calculation of height from middle finger length. 4

Material and Methods
The study was conducted in the department of Forensic Medicine and Toxicology attached to a Medical School located in Mysore, India. In this study length of middle finger & height were measured from 200 individuals (100 males & 100 females) belonging to Mysore district, Karnataka, India aged between 21 and 30 years. Non-resident Indians and individuals from other than Mysore district were excluded from the study. Subjects with Skeletal abnormalities and connective tissue diseases, which may be congenital or acquired, were also excluded. Informed written consent was obtained prior to recording the measurements.

Anthropometric measurements and Techniques:
Measurements of middle finger length of males and females were taken by using a vernier caliper and the height was recorded using Anthropometer rod. Stature was measured as vertical distance from the vertex to the floor. Measurement was recorded by making the subject to stand erect on a horizontal resisting plane, bare footed with shoulder blocks and buttocks touching the wall. Palms of hand were turned inwards and fingers horizontally pointing downwards. Anthropometer was placed in straight vertical position in front of the subject with head oriented in eye-ear-eye plane (Frankfurt Plane). The movable rod of the Anthropometer is brought in contact with vertex in the mid sagittal plane.5 To measure Finger Length the subject is asked to place the hands on a flat table, and the distance between the phallangions and dactylions of the respective fingers was recoded using a vernier caliper.5

Statistical analysis:
The data was analysed using SPSS (Statistical Package for social science) version 18.0 to calculate descriptive statistics of stature and finger length for male & female subjects. For assessing the correlation between the stature and middle finger length, Pearson’s correlation co-efficient was calculated and its significance was tested at a p-value of less than 0.05. The correlation coefficient was calculated separately for both male and female subjects. Linear regression models and multiplication factor were also derived for stature estimation from middle finger length in males & females keeping the stature as dependant variable and middle finger length as an independent variable. A multiplication factor was derived by dividing stature by middle finger length in each individual. Mean of multiplication factor thus derived was taken as the multiplication factor for the estimation of stature from middle finger length in right and left hand

Results
The stature of the individuals included in the study ranged from 159 cm to 182 cm in males and 145cm to 182cm in females. Mean stature was significantly more in males than females. Mean MFL of right and left sides respectively was 9.79 cm and 9.74 cm in males and 9.22 cm and 9.21 cm in females. MFL was more in males than females in both the hands. Descriptive statistics of stature, middle finger length of both hands are depicted in table No.1 and table No.2. Statistically significant correlation was observed between stature and middle finger length of both hands. Pearson correlation (r) for stature and finger lengths was higher among females than males as shown in table No.3. The relationship between middle finger length and stature among males and females is shown in figures 1(a & b) and 2 (a & b) respectively. The multiplication factors derived for the estimation of stature from MFL in both hands of males and females are shown in table No.4. Linear regression equations for estimation of stature in males and females are shown in table No.5. The MFL showed a significant correlation with the stature in males and females. The right MFL in both sexes appears to be the better predictors of stature.
Fig 1 (a & b)

Table 1. Descriptive statistics of stature for the study group

<table>
<thead>
<tr>
<th>Stature (cm)</th>
<th>Male (n=100)</th>
<th>Female (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>159.0</td>
<td>145</td>
</tr>
<tr>
<td>Maximum</td>
<td>182</td>
<td>182</td>
</tr>
<tr>
<td>Range</td>
<td>23.0</td>
<td>37.0</td>
</tr>
<tr>
<td>Mean</td>
<td>170.0</td>
<td>161.626</td>
</tr>
<tr>
<td>S.D</td>
<td>4.97</td>
<td>7.78</td>
</tr>
</tbody>
</table>

Table 2. Descriptive statistics of middle finger length for the study group

<table>
<thead>
<tr>
<th>Middle finger length(cm)</th>
<th>Male (n=100)</th>
<th>Female (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>7.8</td>
<td>7.8</td>
</tr>
<tr>
<td>Maximum</td>
<td>11.1</td>
<td>10.7</td>
</tr>
<tr>
<td>Range</td>
<td>3.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Mean</td>
<td>9.74</td>
<td>9.214</td>
</tr>
<tr>
<td>S.D</td>
<td>0.64</td>
<td>0.62</td>
</tr>
</tbody>
</table>
Table 3. Pearson correlation between middle finger length and stature (CM)

<table>
<thead>
<tr>
<th></th>
<th>Stature</th>
<th>Males (n=100) (p value)</th>
<th>Females (n=100) (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right middle finger length, (RMFL)</td>
<td></td>
<td>0.346</td>
<td>0.360</td>
</tr>
<tr>
<td>Left middle finger length (LMFL)</td>
<td></td>
<td>0.310</td>
<td>0.316</td>
</tr>
</tbody>
</table>

P- value <0.001
Discussion
Prediction of stature plays an important role in the identification as required by the investigating team & also in the anthropological research. Skeletal remains can help to estimate the age, sex, race and stature. Stature is one such parameter that can be established even in mutilated and dismembered bodies.

Over many decades, a close relationship between stature & dimensions of various body segments are reported & the data are frequently employed in medico-legal investigation. In this study an attempt was made to establish the stature of a person by using middle finger length. Males and females aged between 21 and 30 years, those who were natives of Mysore district of Karnataka state were included in the study. In the present study the mean stature among males was 170.84 cm with a standard deviation of 4.9718. The minimum & maximum heights were being 159 cm and 182 cm respectively. Among females mean stature was 161.62 cm with a standard deviation of 7.79. The minimum and maximum heights were being 145 cm and 182 cm, respectively. The Pearson correlation coefficients showed a high degree of correlation and all the values were statistically significant (p value < 0.05).

Macdonnel studied 3000 English criminals. He compared the stature with the length of middle finger. Trotter and Glessel found that there is a loss of height for every two decades of age over the age of 30 years. Therefore in the present study the age of the subjects was taken as more than 21 and less than 30 years.

As this study was conducted on living individuals, a correction factor of 2.5 to 4 cm should be added to the height determined when bones are available for stature estimation. From this study it is found that, for more accurate prediction of stature, independent linear regression equation should be used. This study involved a small sample size and only native people of Mysore district of Karnataka state, so there is scope for further work to determine similar regression equations with larger sample for people from other parts of the Country and World.

Conclusion
Present study shows that there is significant correlation between stature and middle finger length. Hence this can be of helpful can be used in identity of unidentified and dismembered bodies. This study is conducted in localized geographical area with limited sample size hence similar studies are proposed in different population of larger sample size.

References
A Morphometric Study of Measurements of kidney in Adults and Its Relation with Age and Height of the Individual with its Clinical Implications

Vikram Palimar¹*, Anuj Jain², Chandni Gupta³, Anshul Saxena¹**

Abstract

Objective: Renal dimensions are important for the diagnosis of nephropathies. It has been postulated from necropsy studies that variations in renal dimensions and renal weight are related to gender, with weight being higher in males. Thus, the aim of this study was to evaluate the renal dimensions in a south Indian population, and to correlate them with gender, body weight, age, and height. Materials and methods: 130 (65 right and 65 left) normal post-mortem kidneys of adults were studied. Age of the individual was noted. Length of the deceased was measured. Length, thickness, breadth and weight of the kidneys were measured. Statistical analysis was done. Results: The mean length, breadth, thickness and weight of right kidney in males are 10.3, 5.2, 2.6 cm and 140 gm while on left side was 10.4, 5.1, 2.7 cm and 140 gm. In females mean length, breadth, thickness and weight of right kidney are 10.6, 5.4, 2.7 cm and 130 gm while on left side was 10.2, 5.2, 2.6 cm and 140 gm. In our study there was a significant correlation between weight of individual with weight, length and breadth of kidney in males. Conclusion: There was significant correlation seen between height of individual and weight, length and breadth of kidney in males and also between age of individual and weight, length and thickness of kidney in males. In females there was significant correlation between age of individual and thickness of kidney and weight of individual and length of kidney. This study will also be helpful for nephrologist to diagnose diseases in the kidney like renal tumours, hypertrophy or atrophy.

Keywords: Kidney, Dimensions, nephrology, body height

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Introduction

Renal measurements are vital for the diagnosis and for the prognosis of nephropathies.¹ From 4th decade up to 8th decade of life the human kidneys lose roughly a fifth of their weight. Kidneys with length less than 8 cm are considered as contraindication for intervention of renal arterial disease.² Renal dimensional variations can occur in nephropathies due to hypertrophic process and/or atrophy.¹

Renal dimensions can play a significant role in the decision for renal biopsy, renal transplant or avoiding immunosuppressive treatment.³ Renal dimensions are evaluated for the loss of kidney mass and thus for kidney function.⁴ Renal inflammations, nephrologic conditions, diabetes mellitus and hypertension are the most vital co-morbid situations affecting renal size.⁵⁷ Serial measurements can also provide information about disease progression or steadiness.

Factors such as glomerulosclerosis and tubulointerstitial fibrosis might lead to a reduction in renal size and weight, as histological data reveals a reduction in the number of cortical glomerules by 30-50% at the age of 70 years, as well as observing a loss of glomerular lobulation, increasing...
mesangial volume and glomerular collapse, as well as intimal thickening hyalinosis of both the arteries and the arteriola.\textsuperscript{8, 9} On the other hand, there is an increase in kidney size in initial stage renal thrombosis, initial stage diabetes mellitus and renal inflammation.\textsuperscript{6, 10}

It has been proposed from necropsy studies that discrepancies in renal measurements and renal weight are linked to gender, with weight being higher in males. Other studies have also tried to establish a correlation between renal dimensions and age, since it was shown that a reduction of up to 40\% in renal weight occurs as the age advance.\textsuperscript{1}

As the renal size is affected by several causes, it is essential to first establish the normal values. The measurements established and stated in our standard anatomy and urology textbooks reveal the western country measurements and cannot be applied to our country. The renal measurements will differ as we move from one geographical area to another.\textsuperscript{11} Thus, the aim of this study was to evaluate the renal dimensions in a south Indian population, and to correlate them with gender, body weight, age, and height.

**Materials and Methods**

In this study 130 normal post-mortem kidneys, 65 right and left kidneys of same adults of both male and female with their age ranging from 18-85 years were taken from the mortuary of Department of Forensic Medicine. The specimens were washed thoroughly with tap water and gently squeezed to remove the blood clots from the lumen of blood vessels. Specimens were than taken in a tray and associated fat, fascia, nerves and other unwanted tissues were removed. Kidneys which were looking abnormal or diseased to naked eye or those cases whose death occurs due to kidney diseases or those who were having any kidney diseases in the past were excluded from the study.

Length of the deceased was measured with a measuring tape. Length, thickness and breadth of the kidneys were measured with measuring tape. The major distance between the renal poles (superior and inferior) was taken as the length of the kidney. The major distance between the lateral and medial borders perpendicular to the length was taken as the width of the kidney. The breadth was measured at the region of maximum antero-posterior diameter. Weight was measured with weighing machine. Statistical analysis of the parameters was done using Pearson correlation, paired sample T test and independent sample T test.

![Figure 1: Showing the measurements done on kidney. A. Length of kidney, B. Breadth of kidney, C. Thickness of kidney.](image)

**Results**

The mean and range of all parameters of male and female kidney of both sides are shown in table 1. In our study the average length, breadth and thickness of right and left kidney are 10.42±1.28, 5.31±1.03, 2.68±0.74cm and 10.41±1.35, 5.19±1.01 and 2.70±0.76cm. In our study the mean weight of right and left kidney was 140.2±41.5 and 144.8±43.3gms.

There was no significant relation between any parameters of kidney on right and left side in both males and females. But there was significant relation between weight of right and left kidney in total cases. Paired T test value for significant relations between all parameters of right and left side in males, females and total cases are shown in table 2. There was no significant relation in any parameters of kidney between males and females. The P values of independent sample T-test for weight, length, breadth and thickness are 0.72, 0.76, 0.70 and 0.81.

There was no significant correlation between age of individual and any parameters of
kidney in males. But there was significant correlation between height of individual and weight, length and thickness of kidney and also between weight of individual and height, length and breadth of kidney in males. Rest of parameters there was no significant correlation. The values of Pearson correlation tests are shown in table 3. There was no significant correlation between height of individual and any parameters of kidney in females. But there was significant correlation between age of individual and thickness of kidney and also between weight of individual and length of kidney in females. Rest of parameters there was no significant correlation. The values of Pearson correlation tests are shown in table 4.

Table 1. Showing mean and range of all parameters of male and female kidney of both sides.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right</td>
<td>Left</td>
</tr>
<tr>
<td>Length (cm)</td>
<td>Mean ± SD</td>
<td>10.3±1.3</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>7-13.5</td>
</tr>
<tr>
<td>Breadth (cm)</td>
<td>Mean ± SD</td>
<td>5.2±0.97</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>3.5-7.5</td>
</tr>
<tr>
<td>Thickness (cm)</td>
<td>Mean ± SD</td>
<td>2.6±0.74</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>1.5-5</td>
</tr>
<tr>
<td>Weight (gms)</td>
<td>Mean ± SD</td>
<td>140±0.04</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>80-240</td>
</tr>
</tbody>
</table>

Table 2. Showing paired T test value for significant relations between all parameters of right and left side

<table>
<thead>
<tr>
<th>T-test</th>
<th>Weight of kidney</th>
<th>Length of kidney</th>
<th>Breadth of kidney</th>
<th>Thickness of kidney</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>Total</td>
<td>M</td>
</tr>
<tr>
<td>P value</td>
<td>0.06</td>
<td>0.41</td>
<td>0.04*</td>
<td>0.79</td>
</tr>
</tbody>
</table>

*indicates significant values < 0.05. M= Males; F= Females.

Table 3. Showing Pearson correlation values between all parameters of kidney in males with all general parameters of individual.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Age of individual</th>
<th>Height of individual</th>
<th>Weight of individual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of kidney</td>
<td>0.43</td>
<td>0.00*</td>
<td>0.00*</td>
</tr>
<tr>
<td>Length of kidney</td>
<td>0.63</td>
<td>0.02*</td>
<td>0.002*</td>
</tr>
<tr>
<td>Breadth of kidney</td>
<td>0.09</td>
<td>0.22</td>
<td>0.04*</td>
</tr>
<tr>
<td>Thickness of kidney</td>
<td>0.25</td>
<td>0.04*</td>
<td>0.056</td>
</tr>
</tbody>
</table>

*indicates significant values < 0.05.
Table 4. Showing Pearson corelation values between all parameters of kidney in females with all general parameters of individual.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Age of individual</th>
<th>Height of individual</th>
<th>Weight of individual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of kidney</td>
<td>0.25</td>
<td>0.23</td>
<td>0.28</td>
</tr>
<tr>
<td>Length of kidney</td>
<td>0.25</td>
<td>0.15</td>
<td>0.02*</td>
</tr>
<tr>
<td>Breadth of kidney</td>
<td>0.32</td>
<td>0.09</td>
<td>0.32</td>
</tr>
<tr>
<td>Thickness of kidney</td>
<td>0.02*</td>
<td>0.52</td>
<td>0.61</td>
</tr>
</tbody>
</table>

*indicates significant values < 0.05.

Table 5. Comparision of our results with other authors

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sampaio FJ, Mandarim-de-Lacerda CA</th>
<th>Setty SRS, Katikireddi RS</th>
<th>Emamian SA et al</th>
<th>Niels-Peter Buchholz NP et al</th>
<th>Brandt TD et al</th>
<th>Present study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right</td>
<td>Left</td>
<td>Right</td>
<td>Left</td>
<td>Right</td>
<td>Left</td>
</tr>
<tr>
<td>Weight (gms)</td>
<td>-</td>
<td>-</td>
<td>103.04</td>
<td>114.48</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Length (cm)</td>
<td>10.97</td>
<td>11.21</td>
<td>10.92</td>
<td>11.32</td>
<td>10.9</td>
<td>11.2</td>
</tr>
<tr>
<td>Breadth (cm)</td>
<td>-</td>
<td>-</td>
<td>6.2</td>
<td>6.62</td>
<td>-</td>
<td>4.2</td>
</tr>
<tr>
<td>Thickness (cm)</td>
<td>3.21</td>
<td>3.37</td>
<td>3.34</td>
<td>3.54</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Discussion
Renal dimensions are clinically significant, serving as substitutes for renal functional reserve, and are used normally as the basis for making clinical judgements. Renal disease can increase or decrease renal size, and may or may not be accompanied by alterations to the normal organ structure.11 Sampaio FJ, Mandarim-de-Lacerda CA values of average length, thickness of right and left kidney were slightly more than our study this may be because they have done the study on Brazilian population and we have done the study in Indian population.12

Setty SRS, Katikireddi RS values were slightly more than ours this may be because they have done the study in different region like Andhra Pradesh and we have done in Karnataka region. Our weight of kidney was more as compared to their results.13 Emamian SA et al have done the study using ultrasound that’s why their results were more as compared to our results. They found that the renal length correlated best with body height which was similar to our study we also got significant correlation between renal length and body height in males.14

Wang F et al found the mean length of the right, left kidney in males and females as 10.2, 10.5cm and 9.8, 10 cm while in our study the values are 10.3, 10.4cm and 10.6, 5.2cm and in females of left kidney respectively. Even Fernandes et al have done the study on Brazilian population so their values are more as compared to ours and we have done the study in Indian population. While Gupta et al have done the study on ultrasonographic images of north East Indian population that's why there values are less than our values.1,11

Gupta et al and Fernandes et al found that the average length, breadth of right kidney as 8.9,4.7cm and 12.03, 5.64cm in males and 8.9, 4.3cm and 12.01, 5.62cm in females while in our study the values are 10.3, 5.2cm in males and 10.6, 5.4cm and in females of right kidney respectively. Gupta et al and Fernandes et al found that the average length, breadth of left kidney as 9.1, 4.7cm and 12.67, 6.07cm in males and 8.9, 4.2cm and 12.59, 5.99cm in females while in our study the values are 10.4, 5.1cm in males and and
10.2cm. Our values were almost similar to their result.\textsuperscript{15} Niels-Peter Buchholz NP et al and Brandt TD et al have done the study using ultrasound images so kidney length of Niels-Peter Buchholz NP et al was almost similar to ours but Brandt TD et al kidney length was more as compared to ours. But our width of kidney was more than Niels-Peter Buchholz NP et al study.\textsuperscript{16, 17} (Table 5)

A physiological increase of glomerular filtration rate and kidney size can be observed in pregnancy.\textsuperscript{18} Kidney size also increases with increased protein intake in mice.\textsuperscript{19} The renal measurements of a patient are a very beneficial diagnostic parameter both in urological as well as nephrologic practice.\textsuperscript{11} Disorders like systemic ailments, urinary tract infections, congenital anomalies, neoplasia, micro and macrovascular diseases were reported to significantly influence kidney dimensions.\textsuperscript{20} This study will be helpful for forensic experts and for clinicians as in our study we got significant correlation between height and weight of individuals with various parameters of kidney in males and females. But there was not much significant relation between right and left side of the same individual.

**Conclusion**

In our study there was significant correlation seen between height of individual and weight, length and breadth of kidney in males and also between age of individual and weight, length and thickness of kidney in males. In females there was significant correlation between age of individual and thickness of kidney and weight of individual and length of kidney. This study will also be helpful for nephrologist to diagnose diseases in the kidney like renal tumours, hypertrophy or atrophy.

**References**


Original Communication

**Sex Determination using (big bore 16 slice) Multidetector Computed Tomography of Maxillary Sinus**

Rahul P Kotian\(^a\), Shankar M Bakkannavar\(^b\), Madhavan\(^c\), Vinod C Nayak\(^b\), Prerna Pradhan\(^c\)

### Abstract:

The examination of skeletal remains is a most challenging task of forensic investigations. Determination of sex plays an important role in the skeletal examination since it reduces the field of search to 50% as the other sex in the missing population can be discarded from the study. This can be achieved by using various anthropometric methods based on measurements of bones. But most of the times the skeletal remains in question may be recovered in a broken or fragmented state. Hence it is important to use denser bones which are often recovered intact. The maxillary sinus is one of such bones present in the body.

The present study was performed to discover the possibility of sex determination from radiologic measurements of dimensions of maxillary sinus among a known cross-section of South Indian population. In this study, by the use of Multidetector Computed Tomography (MDCT) scan, eight maxillary sinus measurements were assessed in 90 living non-pathologic South Indians comprising 46 males and 44 females aged 17 - 60 years referred to the Radiology Department. The data subjected to statistical analysis revealed the three variables (right antero posterior, left transverse and left cephalo-caudal of maxillary sinus) showing significant differences. In conclusion, MDCT measurements are useful feature in sex determination in South Indians.

### Keywords:

Sex determination; anthropometric methods; Multidetector Computed Tomography

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**Introduction:**

The question of identification arises not only in living but also in dead, especially in case of mass disorders. The procedure of identification of dead known as post-mortem identification is a difficult task for the forensic pathologist. But it is mandatory in terms of the law and to fulfil the social norms.\(^1\) Due to mutilation of body parts, many a times the normal methods of identification using skeletal remains are not possible. In such cases the intact components of the skeletal remains play an important role in identification. One such component is maxillary sinus. It has been reported in the literature that maxillary sinuses remain intact even though the skull and other bones may be badly disfigured in victims who are incinerated.\(^2\)

Maxillary sinuses, the thin walled air filled spaces are located in the maxillary bone. They are two in number and both vary in size and shape significantly. The apex of the sinuses can extend into the zygomatic process and can occupy the zygomatic bone. The floor is formed by the alveolar process. The development of maxillary sinuses starts at the end of the second embryonic month, and completed at the age of about 20 years, when the permanent teeth fully develop.\(^3\)

Originally the knowledge about human paranasal sinus pneumatization was developed by taking anatomical measurements after injecting different materials into cadavers or by performing

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plain radiography. Today these structures are precisely and more accurately assessed with the use of the Multidetector Computed Tomography (MDCT) and magnetic resonance imaging (MRI), with thin axial sections and sagittal and coronal reformatted images as well as three-dimensional reconstructions. Furthermore the application of morphometric procedures to these radiological images adds a new perspective to this analysis.

This study was carried out to assess the significance of MDCT measurements of maxillary sinuses in determination of sex of South Indian populations.

Materials and Methods:
This study is based on a retrospective review of randomly selected MDCT of Paranasal sinuses of 90 patients who had undergone CT Orbito- Meatal Complex (OMC) in 16 slices Philips Brilliance Big Bore MDCT at Kasturba Hospital, Manipal, a tertiary care hospital situated in South India. The data was obtained from the Department of Radiology. The standard operating procedure was followed while performing the MDCT. History and clinical examination prior to the procedure had shown no diseases or abnormality of ear, nose or throat in any of the subjects. MDCT scans with congenitally absent sinuses were excluded from the study. The cases above 18 years of age were involved in the study as the sex determination from the bones of preadolescent individuals is not reliable because the secondary sexual characteristics don’t appear until the bones are remodelled under the influence of estrogen and androgen at puberty. Similar procedure was adopted by Miller and Amin MF et al in their study.

Routine OMC CT protocol was followed for the scan in which the written Informed consent had been obtained by the patients prior to the procedure. Then they were made to lie down on the CT couch in supine position with head supported on a head rest. Head was immobilized with straps. No sedation or contrast media was used for the scan.

Axial images of the OMC were obtained from the occlusal margin of maxillary teeth to the inferior margin of the orbit with a FOV (Field of View) of 183mm using slice thickness of 3mm and increment of 3mm with a high resolution bone algorithm. Other technical parameters were kVp-120, mAs-401 and matrix- 512x512. The scan time was 1.7 sec. The axial images were reformatted to coronal and sagittal planes with a slice thickness of 2 mm and increment of 1mm and images were then used for the radiographic evaluation of the maxillary sinuses to obtain the following measurements using (Extended brilliance phillips workstation) software. All the measurements were obtained between the widest points of the sinuses and volume was generated using the software (Fig. 1 to 6).

1. Right & left antero-posterior (AP) length
2. Right & left transverse length
3. Right & left cephalo-caudal length
4. Right & left volume of maxillary sinus

The mean and standard deviation of both maxillary sinuses measurements were done for all patients and independent t-test was used to compare these values in the both sex. Discriminative functional analysis was used to detect gender by using the significant measurements. The statistical analysis was performed by using the Statistical Package for Social Sciences (SPSS) 11.5 package program.

Results:
MDCT scans of 90 individuals referred to the Radiology Department; aged 18 to 60 years (Table 1) were assessed for eight maxillary sinus measurements. Among 90 adult patients, 53% (n=46) were males and 47% (n=44) were females. The mean antero-posterior, transverse, cephalo-caudal, and volumes of right and left maxillary sinuses with their standard deviations in centimetres are shown in Table 2.

The volume of the maxillary sinuses of right and left sides was significantly greater in males compared to females. The values of
Right Antero-Posterior Length (P=0.004), Left Transverse Length (P=0.007) and Left Cephalo-Caudal Length (P=0.005) were statistically significant. A discriminant functional analysis was performed to these parameters. The accuracy rate of these maxillary sinus measurements was 71.7% in males and 65.9% in females, with a mean of 68.9% (Table 3).

Table 1. Age and gender wise distribution of cases.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 20</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21 - 30</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>31 - 40</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>41 - 50</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>51 and above</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>44</td>
</tr>
</tbody>
</table>

Table 2. Measurements of both maxillary sinuses of male and female (in cm).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sex</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Antero-Posterior Length (RAPL)</td>
<td>Male</td>
<td>3.284</td>
<td>.335</td>
<td>.953</td>
<td>.004*</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.077</td>
<td>.337</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Transverse Length (RTL)</td>
<td>Male</td>
<td>1.952</td>
<td>.299</td>
<td>.076</td>
<td>3.232</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.850</td>
<td>.428</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Cephalo-Caudal Length (RCCL)</td>
<td>Male</td>
<td>3.313</td>
<td>.396</td>
<td>.652</td>
<td>.205</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2.995</td>
<td>.420</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Volume (RV)</td>
<td>Male</td>
<td>21.391</td>
<td>5.343</td>
<td>.640</td>
<td>.220</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>17.038</td>
<td>5.486</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Antero-Posterior Length (LAPL)</td>
<td>Male</td>
<td>3.343</td>
<td>.342</td>
<td>.525</td>
<td>.408</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.095</td>
<td>.318</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Transverse Length (LTL)</td>
<td>Male</td>
<td>1.967</td>
<td>.316</td>
<td>.933</td>
<td>.005*</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.886</td>
<td>.355</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Cephalo-Caudal Length (LCCL)</td>
<td>Male</td>
<td>3.387</td>
<td>.412</td>
<td>.944</td>
<td>.005*</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.082</td>
<td>.456</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Volume (LV)</td>
<td>Male</td>
<td>22.202</td>
<td>5.630</td>
<td>.468</td>
<td>.531</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>18.134</td>
<td>5.167</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SD: standard deviation; Significant P value ≤ 0.05 *.

Table 3. Gender determination from measurements (Right Antero-Posterior Length, Left Transverse Length and Left Cephalo-Caudal Length) of the Maxillary sinus.

<table>
<thead>
<tr>
<th>Predicted Group Membership</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Count %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>29</td>
<td>15</td>
<td>44</td>
</tr>
<tr>
<td>Male</td>
<td>13</td>
<td>33</td>
<td>46</td>
</tr>
<tr>
<td>Female</td>
<td>65.9</td>
<td>34.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Male</td>
<td>28.3</td>
<td>71.7</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Discussion:
The skeletal radiological examination plays an important role in forensic identification. It's a challenging task for the forensic experts especially in case of skeletal remains. Numerous methods have been employed in identification procedure in such cases. Now–a–days, vast use of CT scan Equipment to diagnose expanding number of medical reasons and thereby increasing availability of MDCT scans performed can be used for personal identification. It has been reported that maxillary sinuses remain intact when the skull is incinerated, enabling them to be used for identification. Gender determination is essential for identification. In our study three variables showed significant differences between the genders: Right Antero-Posterior Length, Left Transverse Length and Left Cephalo-Caudal Length of maxillary sinus. The study concluded that the correct predictive accuracy was 71.7% in males and 65.9% in females, with a mean of 68.9%. In 2011, Uthman et al. in their study, using multivariate analysis of maxillary sinus measurements, 74.4% of male sinus and 73.3% of female sinus were sexed correctly. A study done on 13 Egyptian Human Mummies has proved the importance of using CT scans in investigation by improving the quality and quantity of available information of specimens. Teke HY and others in 2006 showed in their research using CT scans that the ability to identify gender using width, length and the height of the maxillary sinus was 69.4% in females and 69.2% in males. The study conducted in Egyptian population by Mohammad F Amin et al showed statistically significant measurements of Left Cephalo-Caudal and left volume. In a similar study done on South Indian population, Left Transverse and Right Volume were statistically significant. In our study, the antero-posterior, transverse and cephalo-caudal measurements of the left maxillary sinus are larger than those of the right sinus in both genders, which are in agreement with Vidya CS et al, Szilvassy J and Amusa YB et al studies and against Amin Mohammed F et al study. It was found in our study that the left maxillary sinus measurements are larger than those of the right sinus in females, and these results were in nonconformity with the results found in Egypt by Amin Mohammed F et al and in Turkey by Teke et al. Conclusion: The maxillary sinus measurements are useful in gender determination. But the measurements to be considered while using it in identifying gender, differ among populations. Hence more and more studies on various populations are necessary. Conflict of Interest: None declared Source of Funding: No funding References 1. Vij K. Identification. In: The Textbook of Forensic Medicine and Toxicology Principles and Practice, 5th edn. New Delhi: Elsevier India (P) Limited. 2005: P 35. 2. Cameriere R, Ferrante L, Mirtella D, Rollo UF, Cingolani M. Frontal sinuses


Fig. 1: MDCT of both maxillary sinuses in 37 years old male, axial image, showing antero-posterior and transverse diameter of right and left maxillary sinuses.

Fig. 2: MDCT of both maxillary sinuses in 37 years old male, coronal reformatted image, showing cephalo-caudal diameter of right and left maxillary sinuses.

Fig. 3: MDCT of both maxillary sinuses in 37 years old male, sagittal reformatted image, showing cephalo-caudal diameter of left maxillary sinus.

Fig. 4: MDCT of both maxillary sinuses in 35 years old female, axial image, showing antero-posterior and transverse diameter of right and left maxillary sinuses.

Fig. 5: MDCT of both maxillary sinuses in 35 years old female, coronal reformatted image, showing cephalo-caudal diameter of right and left maxillary sinuses.

Fig. 6: MDCT of both maxillary sinuses in 35 years old female, sagittal reformatted image, showing cephalo-caudal diameter of right maxillary sinus.
Original Communication

Lip prints – An Important Tool in Personal Identification

Ashok Gupta\textsuperscript{a*}, Viswanathan. K. G\textsuperscript{b*}, Shaila Rani. G.V\textsuperscript{c}, Srijith \textsuperscript{a*}, Siddesh. R.C. \textsuperscript{a*},

Abstract: The study of lip prints is known as cheiloscopy. It is used for the personal identification since lip prints are unique for individuals and do not change during the life of a person. The present study was conducted on 100 South Indian students of 18 to 24 years of age in the Department of Forensic medicine and toxicology, JJM Medical College, Davangere, Karnataka to evaluate the lip print patterns in relation to gender and its consistency for a period of time. The lip prints were obtained on the bond paper and studied with the help of a magnifying lens using Suzuki and Tsuchihashi’s classification. In males, intersecting lip pattern was the commonest pattern, where as in females, vertical lip pattern was the commonest pattern. No change in the lip prints patterns were observed during one year duration in the sample study.

Keywords: Cheiloscopy, Lip Prints, Suzuki & Tsuchihashi’s classification, Identification

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Introduction

Establishing a person's identity can be a very difficult process. Dental, fingerprint and DNA comparisons are probably the most common techniques used in this context, allowing fast and secure identification processes. However, since they cannot always be used, sometimes it is necessary to apply different and less known techniques. And one of the most interesting emerging methods of human identification is human lips recognition.\textsuperscript{1}

Lips are two fleshy folds surrounding the oral orifice. They are lined externally by skin and internally by mucosa. The skin is continuous with the mucosa at the transitional or Vermilion border, a reddish zone covered by the thin keratinized epithelium. Epithelium of the vermilion area exhibits a less well developed stratum corneum than skin.\textsuperscript{2,3}

The external surface of lip has numerous elevations and depressions that form a characteristic pattern, referred to as lip prints, study of which is known as cheiloscopy.\textsuperscript{4}

Lip prints can be obtained at the crime scene from clothing, cups, glasses, cigarettes, windows and doors.\textsuperscript{4}

Lip prints are unique and do not change during the life of a person.\textsuperscript{5} It has been verified that lip prints recover after undergoing alterations like minor trauma, inflammation and diseases like herpes.\textsuperscript{6} The form of the furrows does not vary with environmental factors. However, major trauma to the lips may lead to scarring, pathosis and the surgical treatment rendered to correct the pathosis may affect the size and shape of the lip, thereby, altering the pattern and morphology of grooves.\textsuperscript{7} The lip prints of parents and children and those of siblings have shown some similarities. It has also been suggested that variations in patterns among males and females could help in sex determination.\textsuperscript{8}

Aims and objectives

The objective of the study was to evaluate the lip print patterns in relation to gender, and its consistency for a period of time.

Materials and Methods:

The study was conducted on 100 South Indian students of 18 to 24 years of age in the Department of Forensic medicine and
toxicology, JIM Medical College, Davangere, Karnataka. Consent was obtained from each individual and ethical clearance was obtained from the Institutional ethical committee to conduct the study. The study was performed over a period of 1 year. Lip prints of these individuals were recorded at the beginning of the study and were again recorded after one year, in order to check for its consistency. The individuals with inflammation, trauma, malformation, deformity, surgical scars and other pathology of the lips were excluded.

**Materials:**
The materials used in the present study are as follows: A red-colored frosted lipstick, bond paper, magnifying lens, pen for labeling, tissue paper, water and soap.

**Methods:**
A strip of bond paper was taken and then labeled with name, age, sex of the subject. Before the application of the lipstick the subject was asked to clean the lips with water and dry them with tissue paper. A dark colored frosted lipstick was applied on the lips up to the vermillion border. The subject was asked to rub his/her lips together to spread the lipstick evenly. The paper was folded along the length and was pressed between the two lips of the subject. After obtaining the lip print, the subject was asked to clean his/her lips with warm water and soap. Then lip prints were examined with the help of magnifying lens and patterns of lip prints were studied using Suzuki and Tsuchihashi classification.

The lip prints were classified using the classification given by Suzuki and Tsuchihashi (1970)\(^9\):

1. Type I – Complete vertical grooves that run across the entire lip.
2. Type I’ – Partial/incomplete vertical. Similar to type I but do not cover the entire lip.
3. Type II – Branching
4. Type III – Intersecting
5. Type IV – Reticular
6. Type V – Undetermined/Other.

---

a. Type I : Complete vertical pattern
b. Type I’ : Partial vertical pattern
c. Type I : Branching pattern
c. Reticular pattern

Results
In the present study, it was found that, in males, Type III (Intersecting - 44%) was the most prominent pattern, followed by Type I (Complete vertical - 20%), Type IV (Reticular - 16%), Type I' (Incomplete vertical - 8%), Type II (Branching - 8%) and Type V (Undetermined - 4%). In females, Type I (Complete vertical - 44%) was the most prominent pattern, followed by Type II (Branching - 24%), Type I' (Incomplete vertical - 18%), Type III (Intersecting - 8%), Type IV (Reticular - 4%), and Type V (Undetermined - 2%). Further it was found that in both boys and girls, Type I (Complete vertical - 32) lip print was the most prominent pattern, followed by Type III (Intersecting - 26%), Type II (Branching - 16%), Type I' (Incomplete vertical - 13%), Type IV (Reticular - 10%), and Type V (Undetermined - 3%). (Table 1)

Lip prints of all subjects were recorded twice, once at the beginning of the study and again after one year. The lip prints of all individuals showed a consistent pattern, without any gross difference after 1 year.

Table 1: Distribution of lip prints patterns in males and females

<table>
<thead>
<tr>
<th>Lip print pattern</th>
<th>Male [n (%)]</th>
<th>Female [n (%)]</th>
<th>Total [n (%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I (Vertical)</td>
<td>10 (20%)</td>
<td>22 (44%)</td>
<td>32 (32%)</td>
</tr>
<tr>
<td>Type I' (Partial Vertical)</td>
<td>4 (8%)</td>
<td>9 (18%)</td>
<td>13 (13%)</td>
</tr>
<tr>
<td>Type II (Branching)</td>
<td>4 (8%)</td>
<td>12 (24%)</td>
<td>16 (16%)</td>
</tr>
<tr>
<td>Type III (Intersecting)</td>
<td>22 (44%)</td>
<td>4 (8%)</td>
<td>26 (26%)</td>
</tr>
<tr>
<td>Type IV (Reticular)</td>
<td>8 (16%)</td>
<td>2 (4%)</td>
<td>10 (10%)</td>
</tr>
<tr>
<td>Type V (Undetermined)</td>
<td>2 (4%)</td>
<td>1 (2%)</td>
<td>3 (3%)</td>
</tr>
</tbody>
</table>

Discussion
Identification of unknown individuals (living or dead) is a vital part of the forensic practice and this is based on the theory that all individuals are unique. All the individuals bear some unique characteristic, which make the positive identification possible. One of those unique traits is lip print which do not change during the life of a person. A series of forensic studies on the morphology of the lips and the pattern produced when they are produced onto a variety of surfaces has been done which forms an important tool for personal identification. Lip print pattern examination can help in DNA detection from lip print smear, gender determination, uniqueness of lip print to any blood group, etc. which can be the mainstay of human identification. Apart from living, cheiloscopy can also be used for the identification of a dead person, but for this ante-mortem data of lip prints of the individual concerned must be available which cannot be expected in cheiloscopy and this obviously impairs a comparative study where identification of dead person is concerned.

Lip prints can be present on photographs, cigarette butts, drinking glasses, cups, letters, window panes, etc. examination of which can provide a large information which can be used in the reconstruction of the events and identifying suspects. A lip print at the scene of crime can be basis for conclusion as to the character of the event, the number and sex of the people involved, cosmetics used, habits, occupational trials and the pathological changes of the lips themselves.
This study was carried out to evaluate the lip print patterns in relation to gender, and its consistency for a period of time. In our study, Type III (Intersecting) pattern was found to be dominant in males. Similar findings were noted in the studies conducted by Tsuchihashi, Gondivkar et al., Vahanwala et al., Bajpai et al., and Saraswathi et al. In females, we found Type I (Complete vertical) to be the most common pattern, which is in concurrence with the studies of Vahanwala et al., Bajpai et al., and Sharma et al. In both boys and girls, Type I (Complete vertical) pattern was the most prominent pattern which is also supported by the study of Vahanwalla and Parekh. In some other studies in Karnataka, Rastogi et al. has reported Type I to be predominant in males whereas Types II (Branching) and III (Intersecting) in females; Verghese et al. found that Type IV (Reticular) was the predominant type in both males and females.

**Conclusion**

Lip prints can help investigators in positive identification of living or deceased. This procedure requires further studies with larger sample size. A standard and uniform procedure has to be developed for the collection, development and recording of lip prints and the ensuing comparison. Its application in the forensic field should be widely accepted by both law enforcement and the legal professionals.

**References**


Case Report

Accidental Fatality by Dead Coconut Tree
R Amudha Saharan¹, Arun M ², Chinmayi Y¹, Rakesh MM¹

Abstract:
Coconut tree is often worshipped as „kalpavrisksha“ in Hindu Mythology, (kalpa; desire and vriksha; tree) as it is believed to fulfil one’s wish. Inadequately maintained coconut trees claiming human lives is becoming a matter of concern with rapid urbanization and deforestation, as a need of modern civic requirements. A case of fatal accidental head injury due to impact of a falling dead coconut tree on a 35 year old man is reported and discussed. This case report analyzes the possible grounds on which death and or serious injuries due to falling trees/branches may cause. The inherent risk, its preventability and liability in such tree fall accidents are highlighted.

Keywords: Coconut trees, Urbanisation, civic requirements, inherent risk

Introduction:
Trees and its branches usually do not qualify as a dangerous entity causing injuries and death. But severe injuries from falling trees and branches are more common than one can realize. This may not just apply to storms and other unpredicted natural catastrophe.¹ Ill-maintained, inadequately monitored and aged trees may become hazardous even under regular weather conditions. Such trees may cause unprecedented fatalities. The major chunk of such deaths goes unaccounted in India, as the issue is less spoken or remedies less sought after. The proximity of trees to people and property is a major factor in deciding how rigorously they need to be inspected and what sort of remedial action is appropriate if significant hazards are found.²

Case report:
The deceased was a 35 year old healthy man, who happened to be an unsuspecting passerby on a vacant plot where, land clearance and levelling was underway by a JCB (Joseph Cyril Bamford Excavators Ltd) machine. Inadvertently, the JCB machine had touched the trunk of a „dead‘ coconut tree (Figure 1), bringing it down to earth. The deceased, presumably unable to judge where the tree might land, eventually got his head hit by the trunk of the tree and died instantaneously at the spot (Figure 2). The deceased was shifted to the autopsy room of the department of Forensic Medicine, JSS Medical College, Mysore, by the investigating officer. On external examination, the brain matter was seen protruding out of left ear canal along with frank blood. The principal injuries present on the deceased included a split laceration, 2.5X1 cm and bone deep on left temple; abraded contusion, 4X2 cm, on the outer aspect of left cheek; multiple grazed abrasions, over an area of 21X15 cm, on the front and inner aspect of lower half of right thigh; bony deformity at the lower 3rd of right leg associated with underlying fractures of both bones. The injuries were evaluated as fresh and ante mortem in nature. The internal examination was remarkable with diffuse scalp contusion associated with multiple grossly displaced comminuted fractures of vault and base of the skull (Figures 3 and 4). Meninges were torn and brain matter was protruding out with fractured fragments. Brain was found to be grossly mutilated with

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diffuse cerebral contusions, lacerations and intracranial hemorrhages. Spinal cord was transected at foramen magnum. The cause of death was opined as cranio-spinal lesions, following blunt force impact to head and neck.

**Discussion:**
Tree related fatalities occur in circumstances in which the victims were either not aware of the hazard, felt the hazard was slight, or were unable to diminish the hazard successfully.\(^3\) It is no great insight that there is some inherent risk around trees, which, after all balances tonnes of weight over one’s head.\(^3\) What might be surprising is how few incidents can be readily attributed solely to this inherent risk, without the inclusion of specific reasons.\(^3\) Indian society in general and environmentalists in particular, do not endorse cutting down trees, more than ever, a coconut tree. It is construed as a sin. But one shall realize that cutting down „worn and dead trees” is far more beneficial and safer than leaving them alone, as it was one such tree that had caused the demise of the case subject.

Identification of trees that are in bad physical shape likely holds the key in guarding oneself and others from the hazards of accidental and unforeseen tree falls. The main foci of attention should be on assessment of the tree, its geographical location and prevailing weather.\(^3\) A protocol is suggested to safe guard human lives from unworthy trees. (Table 1)

Table 1: Protocol to safe guard human lives from unworthy trees.\(^3\)

<table>
<thead>
<tr>
<th>1. Assessing trees:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Tree health</strong></td>
<td></td>
</tr>
<tr>
<td>Are there signs of ageing?</td>
<td></td>
</tr>
<tr>
<td>Is the tree dead?</td>
<td></td>
</tr>
<tr>
<td>Are there dead branches or dead leaves or twigs at the end of branches?</td>
<td></td>
</tr>
<tr>
<td>Are there visible signs of rot or fungal attack on the trunk?</td>
<td></td>
</tr>
<tr>
<td><strong>b. Tree structure</strong></td>
<td></td>
</tr>
<tr>
<td>Is the tree leaning?</td>
<td></td>
</tr>
<tr>
<td>Are there any structural weaknesses?</td>
<td></td>
</tr>
<tr>
<td>Are there visible signs of damage to roots, trunk, or branches, such as cracks, or bulges?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Assessing location:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the area at risk from falling branches or the whole tree falling?</td>
<td></td>
</tr>
<tr>
<td>Is the tree particularly susceptible to wind loading from any particular direction?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>3. Assessing weather:</th>
<th></th>
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<tbody>
<tr>
<td>Is the ground soddened?</td>
<td></td>
</tr>
<tr>
<td>Are the rains softened the ground?</td>
<td></td>
</tr>
<tr>
<td>Is there a terrible weather forecast?</td>
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</tbody>
</table>

If the answer to any of the queries in the protocol is *YES*, then probably the tree is a threat to human life and is worth to sacrifice it or steer clear from its vicinity. Along with the risk management plan, an attempt shall also be made to assign the liability in such fatalities.
The plot owner or caretaker may be held liable if actual notice of a dead or decayed tree was not heralded with any attempts to remove it. The plot owner is expected to be reasonably careful to safeguard the human life in the near vicinity. If the landowner is ignorant about the issue, it may be necessary to consult an expert who can determine the pre-fall tree condition by examining the remains of the tree. Whether a tree was decayed, diseased or dead for months or years will have a significant impact on the quantum of damage and subsequent liability of the owner. The liability in the present case may be apportioned between the plot owner and the contractor who was working on the project of site-clearing, which may be inferred as liable.

In general, trees located on public or private property are expected to be maintained in a healthy condition and removed when they are dangerous. Cities or private landowners can be apprehended legally responsible if damage is caused to an individual due to a falling tree or branch.

**Conclusion:**

No tree is entirely safe, given the possibility that an exceptionally strong wind could damage or uproot even a mechanically „perfect” specimen. Although incidents involving trees are likely to be regarded as „freak accidents” under natural circumstances. It amounts to criminal negligence when a tree is severed down by a JCB machine costing the life of a man, which may be qualified to be mentioned under section 304 (a)IPC.

Periodical inspections of health of the trees by private/public land owners and removal of dead and decayed ones shall be mandated. It would prevent precious lives of mankind from unwarranted demise and also evades law suits regarding the issue.

**References:**

Case Report

Double Death Due to Lack of Quick Response Team System
Manjulabai K H. *, (Major) M M Husain**, Pushpa M G***

Abstract:
Like in many other fields Quick Response Team (QRT) is necessary to save the life in medical field as well. It has been observed that, there is no trend of Quick Response Teams at casualties of even tertiary care centers. This is high time to develop the QRTs in addition to CPR (Cardio Pulmonary Resuscitation) teams. This type of team should diagnose the medical/surgical problems and make the quick and prompt decision with respect to treatment and further arrangement for treating the condition in an emergency situation. This case report is example of ‘Double Death’ case due to lack of a team approach in time. The main objective of presenting this case is to highlight the importance of Quick Response Team system, not only hospital based QRT but mobile QRT as well.

Keywords:’ Double Death, Autopsy, Quick Response Team, Placenta,

Introduction:
“To start with death to set back the death”. Duty of a medical doctor towards his/her patients is to prevent or postpone the death in an emergency situation. In case if death occurs then duty of a doctor is to find out the cause of death, time since death, place of death, manner of death & object causing the injuries which lead to death etc. Being an autopsy surgeon, he provides answer for all of the above except preventing or postponing the death. But the information provided by the case in this article helps to prevent or postpone the death in such cases in future, by implementing improvised system & by correcting the past mistakes. Here we are reporting a case of “Double Death” which is simple in outlook but on in-depth analysis there is lack of indeed need system in this sophisticated & technologically advanced era. It is obvious that the Quick Response Team (QRT) system is either dead or in a frozen state, which is the need of the hour in medical profession.

Case History:
A case landed up in autopsy room at 18:35 hours with the following history.
On the unfortunate morning at 09:15 hours a overcrowded four wheeler (car) while proceeding for opening ceremony of a new temple in a hurry, collided with a tree by the side of a tar road on the co-driver side as the driver lost the control. The deceased pregnant lady who was the wife of the driver was the occupant of the front seat. The deceased was semiconscious when she was received at casualty of a tertiary health care center at 14:30 hours on the same day after receiving first aid from a local hospital. There was no history of bleeding through any of the orifices. She was pregnant in the 3rd trimester (Gravida-2,Para-1). At the time of admission, pulse rate was 140/min, systolic blood pressure was 60 mm of Hg, diastolic blood pressure was not recordable, heart sounds present, bilaterally breath sounds present, and Glasgow coma scale score was 10/15. Fracture of the left tibia & lower end of left femur suspected. She was admitted in Neurosurgery and managed conservatively. She was seen by neurosurgeon, orthopaedician, obstetrician, cardio-vascular-thoracic surgeon (CVTS),

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and physician at different time intervals with a time gap of 1-3 hours as per individual references in total 22 hours of hospital stay and ended up in death (12:20 hour). Accordingly survival period was approximately 22 hours in hospital and 27 hours from the time of accident.


**Autopsy findings:** Dead body was that of an adult female with swollen eyelids and distended abdomen, with girth being 75 cm with linea nigra & striae gravidarum (Picture 1). There was abnormal mobility & swelling in the lower part of the left thigh suggestive of fracture femur. On internal examination 2nd & 3rd ribs were fractured on the right side. Two litres of blood stained fluid was present in the right thoracic cavity (includes postmortem seepage of body fluid). Both lungs were collapsed & pale. On opening the abdominal cavity contained two litres of blood stained fluid. Uterus was distended & pale (Picture 2) with multiple contusions and split tear on left outer as well as posterior surface (Picture 2 & 3). On opening the uterus there was escape of liquid blood but no clear amniotic fluid and fresh dead single foetus with adherent torn membranes (Picture 4). Placenta was seen on anterior fundal surface showing 75% separation with numerous retro-placental clots (Picture 5). Subdural haemorrhage (SDH) was seen over bilateral parieto-temporal lobes. All other organs were pale.

Examination of the dead fetus in primary relaxation (Picture 6) revealed no evidence of early post-mortem changes except corneal opacity (starts at two hours after death – Picture 8). Length of the fetus was 43 cms (Picture 7), weight 1669 grams & age was estimated to be between 34 – 36 weeks.

The cause of death was Haemorrhage and Shock as a result of blunt force trauma of abdomen.

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**Picture 1:** Body with distended abdomen & external injuries on the body.

**Picture 2:** Pale distended uterus showing laceration.

**Picture 3:** Pale distended Uterus showing contusions and escape of blood.

**Picture 4:** Opened uterus showing fetus with blood and torn blood stained membranes.
Discussion:
Management of the pregnant patient sustaining trauma practically involves management of two patients (Mother & Fetus). Formation & implementation of Quick Response Teams has decreased morbidity & mortality to a great extent in many countries. In 1995, Lee et al.\(^1\) published one of the first descriptions of the outcomes of using a Quick Response Team. In 1999, Goldhill et al.\(^2\) reported that implementation of a QRT was associated with a 26% reduction in cardiac arrest before patients were transferred to the Intensive care units (ICU). In 2000 Bristow et al.\(^3\) compared one hospital that had a QRT with two other hospitals that had conventional cardiac arrest teams. In that study, the hospital with the QRT had fewer unanticipated ICU admissions and a lower death rate for patients who did not have “do not resuscitate” orders than did the other hospitals. In 2002, Buist et al.\(^4\) reported that implementation of a QRT was associated with a 50% reduction in cardiac arrest outside the ICU. Bellomo et al.\(^5\) reported a decrease in unexpected ICU admissions and a significant reduction in the number of adverse events after a QRT was implemented.

The comparison between clinical & autopsy findings of the case are shown in the tabular form as shown in Table 1.

In this case, as it took five hours to shift the patient to tertiary care hospital since the time of accident & within 22 hours of hospital stay, she was attended by different specialists at different points of time as per the individual references, resulting into “Double Death”. Instead, if these specialist would have had evaluated the patient as a team, or a mobile QRT would have had attended the patient at the scene of accident itself; this would have significantly made a difference with respect to outcome of the case.
Julius Caesar was born on 13th July 100 BC; he was extracted out of the womb of his mother as she died during the labour, just because of the presence of mind of the medical attenders. In this 21st century, an era of cloning, invitro fertilization, organ retrieval & transplantation from dead to dying life, why can’t we save the lives with so much of technological advancement and medical know-how. Here the question is whether mother would have been saved or baby would have been saved or both would have been saved, if a team of doctors would have had attended the patient immediately at a single point of time. We are lacking Quick Response Team system or the drive to create such system to cater for emergency situations.

**Conclusion:**
In the present case it is clear that there was ample time to save the life, outside the womb or inside the womb or even both, if some quick response would have been shown by a team of doctors. Unlike traditional “CPR teams”, the purpose of QRTs is to identify & treat patients before the patients’ condition deteriorates’ to the point that cardio-pulmonary resuscitation is needed. The role of the team is to intervene before a patient had a catastrophic event so that such loss of human life can be avoided, as it is obvious in this case. It is the need of the hour to seriously think about constituting Quick Response Team system & making it effectively functional to ensure that patients get what they need & right when they need it. The makeup of QRTs may vary from one hospital to another, and the specific implementation process varies depending upon the available resources and personnel. Quick Response Teams can be structured as per individual institutional or situational needs.

“Casualties Should Not Be Casual, Let Us Make Human Life Invaluable.”

**References:**

Case Report

Intentional Self harm by a Victim of Elder Abuse
Vinod C Nayak*, Shankr M Bakkannavar*, Pradeep Kumar**, Somshekhar Sharma***

Abstract:
The number of elders is increasing in developing world. Today, the ageing scenario in India is that there are 77 million elder persons in India, and the number is growing. But old age has never been a problem for India where a value based, joint family system is supposed to prevail. Indian culture is respectful and supportive of elders. Hence elder abuse has never been considered as a problem in India and has always been thought of as a problem of west. But as the India is growing old, the cases of elder abuse are rising due to fast pace of modernization that has been taking place and the challenged coping capacities of the younger generation and elder members of the family.
We report a case of an elder abuse wherein an elderly man ill-treated by family members, got disgusted in life and committed suicide.

Key Words: Ageing scenario, Elder abuse, Joint family, Indian culture,

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Introduction:
Elderly Abuse is defined as "A single, or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person.1 The ancient Roman literature often describes it as elders with derision and loathing.2 Elder abuse can destroy an elderly person’s quality of life in the forms of declining functional abilities, increased stress, depression, dementia, malnutrition and death. The risk of death for elder abuse victims is three times higher than for non-victims.2 Types of elderly abuse are Physical, Sexual, Psychological, Neglect, etc….In India the prevalence rate of elder abuse is about 14%.2 Among the common forms of abuse prevalent in India, disrespect tops the list followed by verbal abuse and economic exploitation.3

Case Report:
History:
A 65 years old male was suffering from depression for the last 7 years, but was not on medication. He committed suicide by jumping in to the well nearby his house. He was disgusted in life due to lack of care from his relatives. This was the well-thought-out motive for the suicide.
On Autopsy:
The External Examination revealed the body of an adult male with cachexic features. Further examination revealed that the grey colour mucoid fluid present over both the nostrils. Soddening of the hands and feet was present bilaterally. He was severely malnourished with weight of 38 kilograms (Fig.1). The mud stains were present over the body as well as on the apparel. The fingernails had a bluish discoloration. There was presence of faecal staining on the undergarment worn by the deceased. A variety of ante mortem injuries were present over the body. Multiple abraded contusions of varying dimensions were present over the chest, back, right shoulder and the iliac crest on both sides. A notable injury, split laceration measuring 10 cms was present over the right mastoid.
Internal Examination revealed a gross distension of gall bladder as well as a loss of abdominal fat. It also showed the scalp contusion measuring 6 x 3.5 cm present over the right parietal region. The Dura was intact and tense on examination. The brain was softened, congested and oedematous. Diffuse Subarachnoid haemorrhage was present over the

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base of frontal lobe bilaterally. Both the lungs were firm, congested, oedematous, crepitant and purulent frothy fluid oozed out on cut section. Right and Left lung weighed 810g and 645g respectively. The right Lung showed an incidental finding of fibrotic changes in the upper zone of the upper lobe. The Trachea showed signs of congestion and some reddish brown fluid. All the other organs were unremarkable.

**Cause of Death:**
The deceased died due to asphyxia consistent with the features of drowning.

**Discussion:**
We are challenged to be aware of the many faces of elder mistreatment and to understand it in the broader context of domestic violence. We should learn how the signs of elder abuse differ from the normal ageing process. The center for elder abuse and neglect under the University of California has maintained that all injuries must be treated as abuse unless otherwise proved. The pattern of bruises inflicted as a result of abuse is distinct from that of accidental trauma and is shown to be more pronounced in areas as the face, lateral aspect of right arm and posterior aspect of the torso. On many occasions the elderly need counseling and repeated assurances to make them reveal presence of abuse. Primary care physicians hold the key to diagnosing or detecting elder abuse and must be involved to look for psychological and physical signs of abuse.

In the context of the present case, there were specific findings of neglect in the form of starvation signs viz. gall bladder distension and loss of subcutaneous fat. Another factor to be noted involves the history wherein the relatives have accepted that the deceased was kept in a confined space on suspicion of mental disease. However further probing by the investigators revealed that no medical opinion, assistance or intervention was sought for the alleged mental disease history. Modern reports of elder abuse were first noted in the medical literature in England in 1975 when the British Medical Journal published a report of granny battering. Methods to prevent elderly abuse are to implement Advocacy, which is defined by Advocacy charter, UK (2002) as —takingaction to help people say what they want, secure their rights, represent their interests and obtain services that they need. Respite care—having someone else care for the elder, even for a few hours each week—is essential to reducing caregiver stress. Social contact and support are absolutely essential for the elderly who have undergone the abuse. In the medical specialties of forensics, geriatric medicine and in the emergency room, there must be an active thought process to look for signs for abuse of the elderly, both psychological and physical. Effective interventions can prevent or stop elder abuse.

**Conclusion:**
Elderly Abuse is no longer a theoretical concept but entity with valid and pressing needs for resolution. Elder abuse, like other forms of violence, is never an acceptable entity as per the law. Stricter legislation and their effective implementation along with setting up of old age centers for this vulnerable geriatric population can help in curbing the problem of elder abuse.

**References:**
8. Levine JM; Elder Abuse and Neglect. A Primer for Primary Care Physicians; Geriatrics. Oct 2003; 58(10): 37-44.


Fig 1: Severely malnourished elderly male
Letter to the Editor

31-10-2014

Sir,

The article titled Recent changes in Medical Examination of sexual violence cases authored by Dr. Jagadeesh.N published in JKAMLs Vol 23, No 1, Jan-Jun 2014 is very informative and such articles dealing with legal intricacies are welcome.

The recent amendments & new acts have further complicated handling such cases by investigating agencies & doctors. Even the courts shall have dilemma to deal with such cases. There is ample scope for frivolous charges & is evident by sudden rise in cases mainly for gain, to defame, avenge & for extortion, etc.

The amendments have made life of men miserable because any jest move, gesture of his can be charged of rape to fix him! He can be exploited, booked, tortured & traumatized by woman with knowledge, scope of Law and their loopholes.

Now the popular statement on rape is more apt.
—Rape is easy to allege, hard to prove & harder to disprove!

The need of hour to curb the menace is uncomplicated, lucid Laws, stringent swift action with higher punishments to the real culprits.

I expect many more such articles on Laws in relation to medical profession by our learned colleagues with advantage of Law degrees to their credentials.

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KARNATAKA MEDICO-LEGAL SOCIETY (KAMLS)  
Regd.No: 295/91/92

Karnataka Medico-Legal Society (KAMLS) is functioning in Karnataka since 1990. Presently it includes 960 Life members from the fields of Forensic Medicine, Forensic Science, doctors from Primary Health Centres and other specialities, Retired Judges, Lawyers, and Senior Police officers from all over the country. The society is actively involved in conducting conferences, CMEs and workshops throughout the State. We expect to grow with time and acquire a huge stature successfully accomplishing the aims and objectives for which it was formed.

AIMS AND OBJECTIVES:
To,
1) Organise in a body all persons who are practicing or are interested in the discipline of Forensic Medicine to facilitate mutual acquaintance and collaboration among themselves.
2) Maintain the honour and dignity of the members of the Society. To promote professional fellowship, co-operation and exchange of views amongst members and to safeguard their interests in the sphere of their activity.
3) Promote study and research in Forensic Medicine and to share professional experience of the members among themselves.
4) Maintain uniformity in the procedure of Medico-legal service in Karnataka.
5) Improve the organizational set-up and functioning of Medico-legal service in the state.
6) Guide Medical Officers in the performance of their Medico -legal work.
7) Suggest up gradation of the Government laws guiding Medico-legal practice from time to time.
8) Get affiliation with similar associations at National and International level.
9) Create a better understanding among the public regarding Medico-legal and allied matters.
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11) Exchange technical expertise with Forensic Scientist and legal experts to improve the scope of the Criminal Investigation.

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To be a —Life Memberl, one has to pay an one time amount of Rs. 2050/- towards the registration charges. Demand Draft should be in favour of —Karnataka Medico Legal Society, payable at Bangalore.
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Date of Birth:

Qualification:

Designation:

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