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Contents

Role of Sternal Index in Determination of Gender

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Abstract

A post-mortem study was conducted to differentiate male and female sternum. A total 100 sternums of adult individuals (56 males & 44 females) were obtained from the cases brought for autopsy to the Department of Forensic Medicine & Toxicology, Lady Hardinge Medical College, New Delhi between the periods August 2005 to March 2007. Our study concluded that the sternal index was not reliable for determining sex.

Introducation

Determination of sex from sternum for the purpose of identification is required in many medicolegal cases. Determination of sex is based upon the morphological and morphometrical features. Studies for determination of sex from the various dimensions of adult sternum are rather limited. According to several workers, the sternal index is reliable parameter.However some thinks that it is of no practical value.

Materials & Methods

The present study was carried upon 100 sternums obtained from known male and female (56 Male and 44 Female) dead bodies brought for medico-legal autopsy. As sex differentiating features in the bones are well marked only after puberty and pieces of mesosternum complete fusion by the age of 25 years, sternums of individuals above 25 years of age were taken for the present study. The various dimensions were measured using Helio's Dial Caliper, which gives more accurate reading, up to 1/100 of mm. The following dimensions of sternum were measured in millimeters & evaluated.

- Length of manubrium (X)
- Length of mesosternum(Y)
- Manubrio- corpus index or Sternal index (S.I.) =X /Y x 100

The data obtained was analysed statistically to find out the range, the mean and standard deviation. The p value was determined to find out whether the sexual differences between means were significant or not. The data was also analysed statistically to find out the number of cases lying in overlapping zones and to find out the reliability of sternal Index in determination of sex.

Observations and Results

The results of various measurements of sternum of the present study are shown in Table No. I & II.

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Table I. Measurement of the sternum in two sexes

Parameters	Sex	Range (mm)	Mean (mm)	S.D.	Level of significance for the difference between the means
Length of Manubrium (X)	M	38-52	45.749	2.989	P < 0.001
	F	36-49	41.204	3.307	
Length of Mesosternum (Y)	M	79-109	100.279	6.248	P < 0.001
	F	62-91	78.346	6.256	
Manubrium-Corpus Index (X/Y × 100)	M	38-58	46.089	3.750	P < 0.001
	F	45-62	56.703	3.982	

Table II. Number and Percentage of cases falling in overlapping zone.

Parameter	Sex	Number of cases in overlapping zone	Percentage of cases in overlapping zone
Manubrium-Corpus Index (X/Y × 100)	M	34	60.71
	F	40	90.91

In the present study, it was observed that the mean sternal index was 46.089 for males and 56.703 for females. The level of significance of the difference between the means was statistically highly significant (p< 0.001) for sternal index (Table I). Out of 56 males sternums, 34 male cases (60.71%) were lying in overlapping zone while of the 44 female cases, 40 cases (90.91%) were lying in overlapping zone. Only 22 male and 4 female cases were not lying in the overlapping zone (Table II). In spite of significant p value (p<0.001), for the difference between sternal index of male and female (Table II & Figure 1), the sternal index could not be considered as a reliable parameter for sex determination. It could be due to overlapping of maximum sternal indices among both males and females.

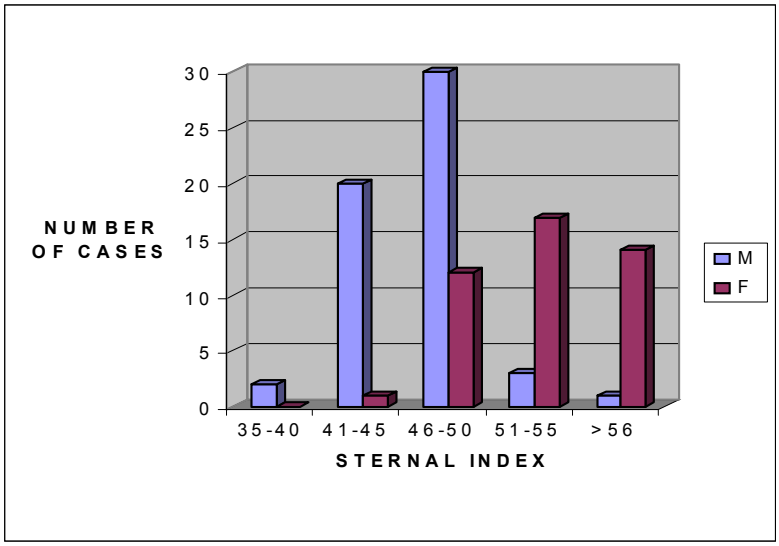

FIG 1. Sternal Index Vs Number of cases lying in Overlapping zone

Discussion

According to Hyrtl's law, manubrio corpus index (sternal index) exceeds 50 in females and is less than 50 in males.[1] Table No. III gives the observations of various workers regarding the percentage of cases obeying the Hyrtl's law in the two sexes.

TABLE III: NUMBER & PERCENTAGE OF CASES OBEYING HYRTL'S LAW (X/Y × 100=<50 MALE, >50 FEMALE) AS RECORDED BY VARIOUS WORKERS.

OBSERVER	NUMBER OF CASES	SEX	% OF CASES OBEYING LAW
Dwight (1890)[2]	142	M	59.10
	86	F	60.40
Patermoller (1890)[1]	55	M	65.00
	33	F	-
Krause(1897)[1]	-	M	-
	14	F	43
Ashley (African) (1956)[3]	85	M	64.70
	13	F	69.20
Ashley(European) (1956)[3]	378	M	52.90
	171	F	69.30
Narayan and Varma [4] (1958)	126	M	34.12
	27	F	81.48
Jit et al (1980)[5]	312	M	31.08
	88	F	88.64
Dahiphale et al (2000)[1]	96	M	52.20
	47	F	100
PRESENT STUDY (2006-07)	56	M	89.28
	44	F	75.00

In the present study it was observed that the mean sternal index in male and female were 46.089 and 56.703 respectively. The average difference between the sternal index in two sexes was 6.613 which was statistically highly significant ($p<0.001$).

It was also observed that 89.28% male and 75.00% female specimens obey the Hyrtl's law (Table III). However, the overlapping between the manbrio - corpus indices of two sexes was also 74.00% (Out of 100, 34 male and 40 female). Therefore, the law was not reliable when applied to an individual specimen in determining the sex. This is in agreement with Ashley (1956), Jit et al (1980) and Dahiphale et al (2002) who found the law to be 'unreliable.'

Conclusions

1. Manubrio-corpus index (sternal index) was also found to be unreliable in sex determination. The mean sternal index for male and female were 46.089 and 56.703 respectively.
2. 89.28% male and 75.00% female specimens obey the Hyrtl's law.

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Tooth Dimension as a Distinguishing Trait Between Human Sexes An odontometric study on Bagalkot population

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Abstract

Forensic odontology is a lineage that deals in relation to jaws and teeth as an evidence to law and justice. Tooth serves a prime importance in the context of sex identification. This study is an odontometric analysis performed on dental casts with a sample of 952 teeth (476male: 476 female) which were obtained from Dept. of Orthodontics PMNM dental college Bagalkot. Mesiodistal and Buccolingual dimension of each tooth crown was measured with a caliper device and statistical analysis for significance of sexual dimorphism was done with student's t test. The result showed that sexual dimorphism is significant in relation to mesiodistal diameter of canine (p=0.007 maxilla p=0.003 mandible) and buccolingual diameter of canine (p=0.012 maxilla, p=0.015 mandible) followed by mandibular premolar (p=0.016) but less significant in case of lower lateral incisors (p=0.013). Furthermore, there was statistical significant difference in tooth crown dimension between males and females where the males showed higher mean values. The results of the current investigation are of great value to the anthropologist as well as to the forensic odontologist in understanding dimensional variation in genders.

Key words

Odontometry, Tooth dimensions, Forensic.

Introducation

Forensic dentistry is an interdisciplinary science which in everyday practice applies to all the knowledge of dental science, widely speaking the natural sciences[1]. The signs of forensic dentistry deals with relation of teeth and jaws as evidence to law and justice, and one of the principle objectives in this field are the personal identification and sex determination. The core of personal identification is by recording the post mortem observations, and comparing these with anti mortem records. The presence of restorations, dentures etc. could be compared. But sex determination is rather difficult in examining the destroyed jaws, skeletal remains and tooth of unidentifiable dead bodies. Bodies of people who have been deceased for some time prior to discovery and those found in water also present objectionable and difficult identification. Through the specialty of forensic dentistry, dentist can play a small but significant role in this process. By identifying the victims of crime and disaster through guidelines and standards a dentist can assist those involved in crime investigation. Teeth are known to be unique organs made of the most enduring mineralized tissues in the human body. As such, they are resistant to mechanical, chemical, physical and thermal types of destruction. Therefore, they are very important elements in the identification of skeletal remains, especially in cases when, due to the poor preservation of skeletal remains, the identification is not possible by standard methods.[2] Sex determination using dental features is primarily based upon the comparison of tooth dimensions in males and females, or upon the comparison of frequencies of non-metric dental traits, like Carabelli's trait of upper molars, deflecting wrinkle of lower first molars, distal accessory ridge of the upper and lower canines or shoveling of the upper central incisors.[3]Therefore, odontometrics provide exhaustive information on the sex of the deceased. There are numerous studies in which differences in male and female odontometric features have been identified. Considering the fact that there are differences in odontometric features in specific populations, even within the

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same population in the historical and evolutional context, it is necessary to determine specific population values in order to make identification possible on the basis of dental measurements[4]. Sexual dimorphism of teeth has been studied extensively by means of odontometric analyses, and most studies have shown statistically significant differences.[5] These values can be of use in determining sex in specific cases: in individual, as well as in group (mass disasters, archaeological sites, etc.).[6] The present study is an attempt to present odontometrics as an easy-to-use additional technique to determine sex in south indian population without the use of the complicated statistical softwares.

Material and Methods

The study comprised of 952 sample teeth (476Male: 476Female) obtained from dental casts in the age range of 16-27 years selected from the Department of the orthodontics PMNM dental college Bagalkot. The casting was done in a standard way used by dentists. All subjects were free from obvious problems that could disfigure or affect the face and dentition. The impressions were taken with alginate and casts were poured immediately with type IV dental stone to minimize the dimensional changes. Manual vibration was done to eliminate air bubbles.

Inclusive criteria for cast selection were as follows:

1. Presence of all permanent teeth from central incisors to second molars in all four quadrants.
2. No history of previous orthodontic treatment.
3. Absence of malpositioned, heavily worn and carious teeth in the cast.
4. No evidence of bubbles or fractured teeth in dental casts.

Instrument & Measurement Methods

Measurements of the permanent tooth crown were taken with a sliding vernier calliper, which was sensitive to 0.1 mm. The measurements were performed by one person and all values were measured in millimeters and average was rounded to two decimal places. In order to assess the reliability of the measurements, intraobserver error was tested by notifying multiple readings at its greatest convexity and highest among these was taken. Each tooth was measured in two different dimensions i.e. mesiodistal and buccolingual.

Mesiodistal crown diameter

Mesiodistal diameter of the tooth crown was taken at the greatest mesiodistal dimension parallel to the occlusal and facial surface of the crown.

Buccolingual crown diameter

Buccolingual crown diameter was the greatest distance between the facial and lingual surfaces of the crown, taken at right angles to the plane in which the mesiodistal diameter was taken.

Statistical Analysis

Statistically significant sexual dimorphism in male and female odontometric features was tested by the Student's t-test in Microsoft excel 2007. The level of statistical significance was set at $p < 0.05$.

Results

The measurement of the mesiodistal diameter was conducted on a total of 952 permanent teeth. There was a statistically significant difference in the mesiodistal diameter of the crown of the maxillary canine and mandibular canine. In males the measured value for canine was 8.09 mm in maxilla, 7.11mm in mandible ($p<0.007$) and females showed 7.49 mm in maxilla,6.31 mm in mandible ($p < 0.003$), Table 1. The buccolingual diameter of the tooth crown was measured on a total of 952 permanent teeth. There were statistically significant differences between males and females in the buccolingual diameter of the crown of the maxillary canine (males 7.68 _ 0.70 mm, females 7.16 _ 0.60 mm, $p < 0.020$), and the mandibular first premolar (males 7.76 _ 0.75 mm, females 7.06 _ 0.50 mm, $p < 0.016$), Table 2.

We have also estimated the amount of sexual dimorphism calculated as $100(\frac{M}{F} - 1)$ for each tooth, as also given in the graph 1& 2. Canines showed maximum percentage of sexual dimorphism in maxilla and mandible (mesiodistally 9.1&10.4, buccolingually 8.6 & 11.4 respectively)

Table 1 : Mesiodistal diameter of the crowns, Average diameter, Standard deviation and p value

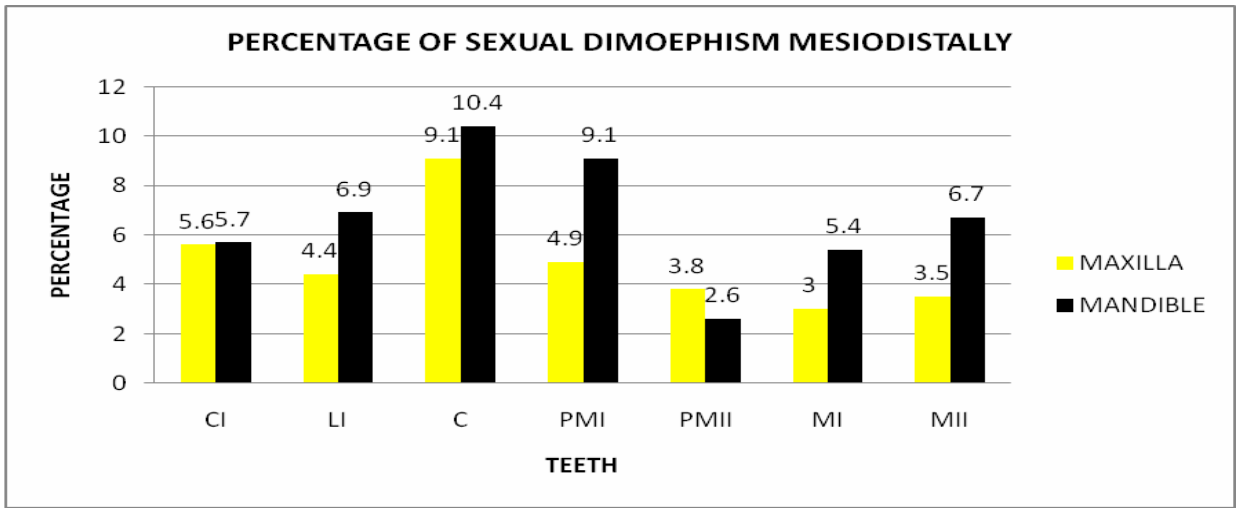
N, number of teeth; A, average; SD, standard deviation; *, statistically significant; C1, central incisor; LI, lateral incisor; C, canine; PM1, first premolar; PMII, second premolar; M1, first molar; MII, second molar

Table 2: Buccolingual diameter of the crowns, Average diameter, Standard deviation and p value

MESIODISTAL	LABIOLINGUAL DIAMETER OF THE CROWN										
		MALE				FEMALE					p-VALUE
		GN m)	SD	AVG (mm)	N	SD	AVG (mm)	N	SD	AVG (mm)	SD	
MAXILLA	MAXILLA										
CI	CI	34	0.38	7.10	34	0.36	8.24	34	0.70	6.76	0.045	0.68	0.052
LI	LI	34		6.14		0.38		34		5.85	0.53		0.378
C	C	34	0.19	7.68	34	0.53	7.49	34	0.50	7.16	0.007*	0.63	0.020*
PMI	PMI	34		8.69		0.41		34		8.46	0.68		0.176
PMII	PMII	34	0.34	8.67	34	0.48	6.82	34	0.36	8.54	0.166	0.42	0.264
MI	MI	34		10.98		0.54		34		10.72	0.81		0.039
MII	MII	34	0.20	10.16	34	0.40	9.36	34	0.24	9.81	0.095	0.93	0.069
MANDIBLE	MANDIBLE												
CI	CI	34		5.42		0.57		34		5.04	0.64		0.395
LI	LI	34	0.51	5.81	34	0.62	5.22	34	0.62	5.39	0.025	0.58	0.083
C	C	34		7.05		0.45		34		6.39	0.69		0.045
PMI	PMI	34	0.43	7.76	34	0.37	6.97	34	0.47	7.06	0.116	0.39	0.016*
PMII	PMII	34		8.30		0.36		34		7.97	0.17		0.355
MI	MI	34	0.34	10.78	34	0.47	10.83	34	0.64	9.78	0.060	0.42	0.059
MII	MII	34		9.74		0.53		34		9.42	0.53		0.134

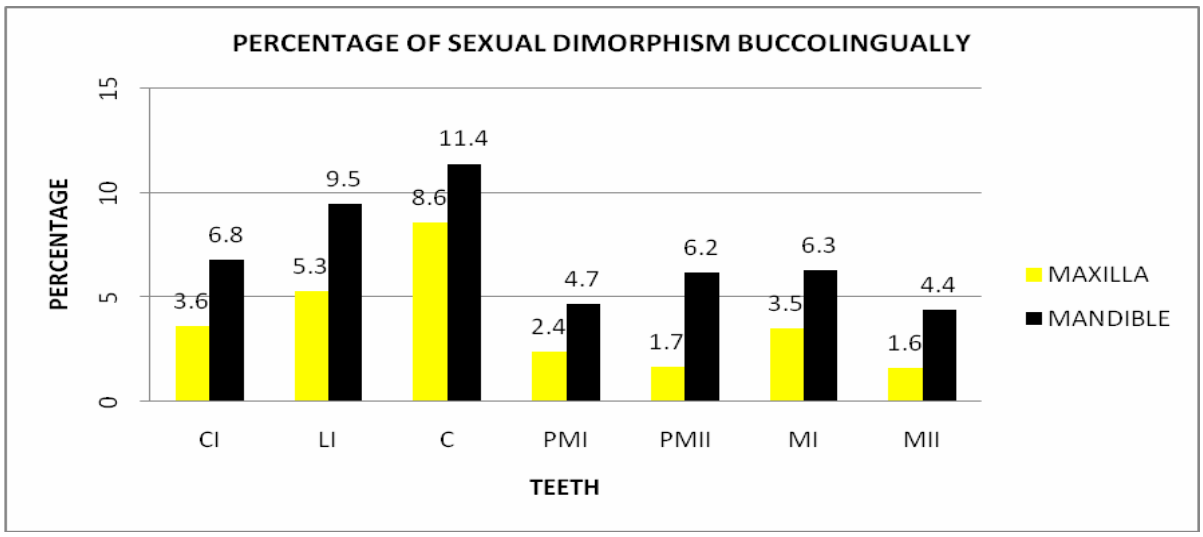
N, number of teeth; A, average; SD, standard deviation; *, statistically significant; C1, central incisor; LI, lateral incisor; C, canine; PM1, first premolar; PMII, second premolar; M1, first molar; MII, second molar

Graph 1 showing percentage of sexual dimorphism mesiodistally in crowns



C1, central incisor; LI, lateral incisor; C, canine; PM1, first premolar; PMII, second premolar; M1, first molar; MII, second molar

Graph 2 showing percentage of sexual dimorphism buccolingually in crowns



Discussion

Sex determination, one of the indispensable features of identification is a much more challenging task. Unfortunately, it is also much less unswerving if performed on poorly preserved remains. Teeth can be reliable marker to raise the percentage of success in sex determination, as they are an excellent material in living and nonliving population for anthropological, genetic, odontologic and forensic investigations. Their robustness in the face of fire and bacterial decomposition makes them of great magnitude for identification.

Although human sexes differ from each other considerably, still there are population based anatomical variations in teeth. Many researchers have done studies on the parameters of teeth anatomy. The canine index was analyzed by Pettenati et. al. and they proved that the tooth diameters can be successfully used in determining sex in cases with poor skeletal remains. Stroud et al 1994 showed that males have larger mesiodistal diameter of a single tooth, which may be attributed to thicker dentine. The Mesiodistal and Buccolingual diameter of the permanent tooth crown are the two most commonly used and researched features used in determination of sex on the basis of dental measurements. Teschler & Nicola 1998 performed an investigation on French students and confirmed the difference existing between male and female buccolingual diameter of mandibular canine. They concluded that

odontometrics was an immediate and uncomplicated method of sex determination. A study on Chinese population performed by Lew and Keng in 1991 revealed statistically significant difference between male and female in mesiodistal and buccolingual diameter of canine.

The present study was done on Bagalkot population in South India which sustain the earlier studies and emphasize that dental dimorphism may be used for sex identification. This method is easy on the pocket; require no proficiency apart from the fundamental particulars of dentistry. The present study establishes the existence of a noteworthy statistically significant sexual dimorphism in buccolingual and mesiodistal diameter of permanent canines, first mandibular premolar and mandibular lateral incisors. In order to avoid statically errors in this study all teeth exhibiting macroscopic changes were excluded. A number of researchers have shown that males have larger teeth than females (Teschler-Nicola 1998, Muller et al 2001, Lew & Keng 1991). This is confirmed by the present study. It is considered that the odontometric features of teeth are population specific (Iscan & Kedici 2003). India is a large fraction of world population , such studies would generate a raised area for making the dimensional data of Indian population as a standard that may be of beneficial in educational, research and forensic fields in India.

Conclusion

The advantage in determining sex by the means of odontometric features is its easiness, rapidity and cost effectiveness, while the utmost disadvantage is the leeway of error in the cases where the normal dimension of the teeth is distorted. Statistically significant values in permanent canine obtained in this study strengthen the previous studies in Indian population. This procedure of examination may be of relative importance while determining the sex of an individual but not of absolute certainty. Therefore it can be taken as an adjunct to various other methods of sex identification.

Acknowledgement

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Study of Sodium & Glucose levels in Cadaveric Synovial Fluid to Estimate Post-Mortem Interval

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Abstract

An indicator "Time of death" is very pertinent for the investigating agency to initiate the scrutiny regarding the death and ultimately to connect the criminal with crime. Estimation of sodium and glucose in synovial fluid obtained from knee joint of 123 cadavers revealed not significant changes in concentration of sodium and glucose with increase in time since death.

Keywords

Synovial fluid, Glucose, Sodium, Post-mortem interval.

Introduction

One of the most important questions at any forensic autopsy that until now has not been answered satisfactorily is the exact moment of death. To determine the exact moment of death in medico legal cases is not possible since post-mortem changes in the dead body are variable and often misjudged1, 8, 11.

Since many years, Forensic pathologists have tried hard to solve this problem by developing a method that would permit the determination of post-mortem interval with more precision. However the result of all these often vary, extensive studies shows clearly that moment of death can only be fixed within certain limits of probability. For example time since death, can be calculated from taking into consideration many factors like the classical triad (rigor mortis, PM lividity, and post-mortem cooling) changes in eyes, contents of stomach and bladder, greenish discoloration of right iliac fossa and modified form of decomposition like adipocere and mummification.

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No doubt, by these methods post-mortem interval can be measured in a scientific manner, but none of the parameters are either singly or collectively reliable in measuring exact post-mortem interval 9.

Various authors have studied different aspect of post-mortem chemistry with conflicting and inconclusive results. As synovial fluid is more protected and less prone to burns or atmospheric variations in comparison to other body fluids such as CSF and blood. It was thought that the post-mortem chemistry of synovial fluid might be helpful in estimating post-mortem interval with much desired accuracy 12, 14.

The aim of present study was to estimate post-mortem interval by sodium and glucose levels in joint fluid, to get hints for the reliability and to establish reference values for synovial fluid. Therefore in 123 cases with known post-mortem interval synovial fluid was taken and analyzed for sodium levels on flame photometer and analysis of glucose levels in synovial fluid by glucose oxidase method and the result showed not significant changes in sodium and glucose concentration with increase in post-mortem interval. Cause of death and age had insignificant effect on changes in sodium and glucose concentration in cadaveric synovial fluid 7, 13.

Material & Method

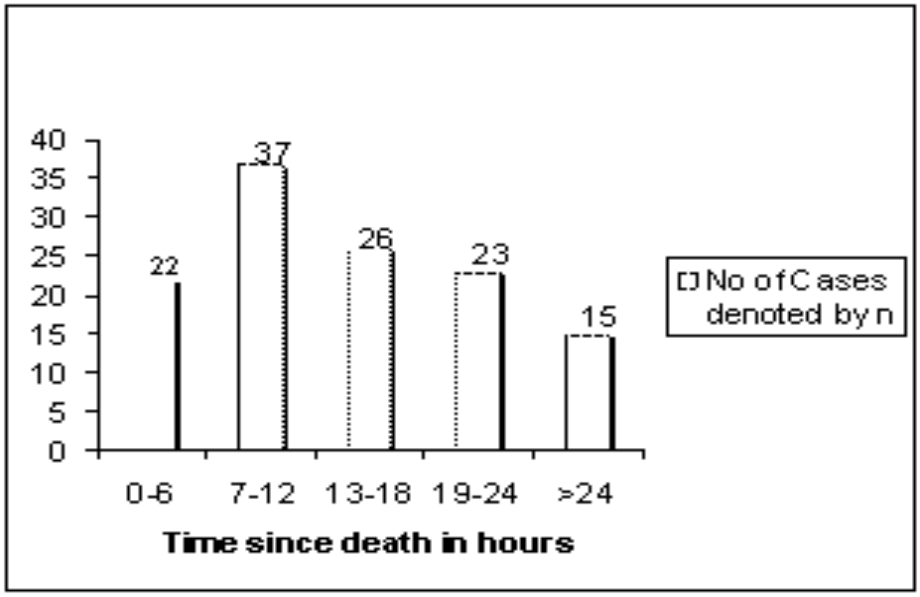
In the present study synovial fluid was aspirated from the knee joint by standard procedure as per adopted by D. J. U. Plesis 12 (1975) of 123 cases with known time since death who were subjected to medico legal autopsy in the mortuary of Department of Forensic Medicine and toxicology at Mahatma Gandhi Institute of Medical Sciences, Sevagram during the period of one year from Jan 2004–Dec 2004. Conditions for exclusion were, dead bodies, which were kept in cold storage, cases of injury to knee, infective conditions of joints (Rheumatism, arthritis etc.) and of unknown

time of death were discarded. Samples, in which synovial fluid was cloudy, bloody, yellow to greenish cloudy, turbid and hemorrhagic in nature were discarded. The synovial fluid was won by puncturing the Supra-patellar pouch. The viscosity of synovial fluid made aspiration some times complicated but mostly enough fluid could be obtained (approximately 1 ml per knee). If immediate analysis was not possible, the fluid were stored at 4 0 C for analysis on the very next working day. Prior to analysis, fluids were centrifuged for 10 minutes at 3500 rpm, samples of synovial fluid were analysed for sodium (Sodium ion by flame photometer in EEL flame photometer (model no ELCO26D) and glucose by glucose oxidase method using Erba glucose diagnostic kit Germany. The data so collected was analyzed statistically.

Observation

The post mortem interval ranged from 0 – 48 + hrs, the cases were classified according to the time interval since death (figure 1) firstly it can be stated that examination of parameters was possible with the collected material.

Fig.1 absolute no. of cases are denoted by n; the x axis means the post-mortem interval or time since death



Out of total 123 cases examined, 82 cases were males and 41 females. Age distribution varies from 6-76 years. Maximum no. of cases i.e. 27 were observed in the age group of 20-29, whereas only 2 cases were available in 1-9 years of age group. Detailed distribution of age, sex is shown in table 1.

Table No 1: Age and Sex distribution.

Table 2: Distribution of cases regarding cause of death.

Sr. No	Cause of death	No. of cases.
1	Mechanical injuries	48
2	Poisoning	23
3	Natural causes	25
4	Asphyxia	9
5	Thermal injuries	18
	TOTAL	**123**

As per table no 2, it is obvious that maximum no of cases i.e. 48 died due to mechanical injuries, 23 due to poisoning, 25 due to natural causes, 18 died due to thermal injuries, while minimum no of cases i.e. 9 died due to asphyxia.

Table 3: The Descriptive statistical analysis of Variable (ANOVA) Sodium

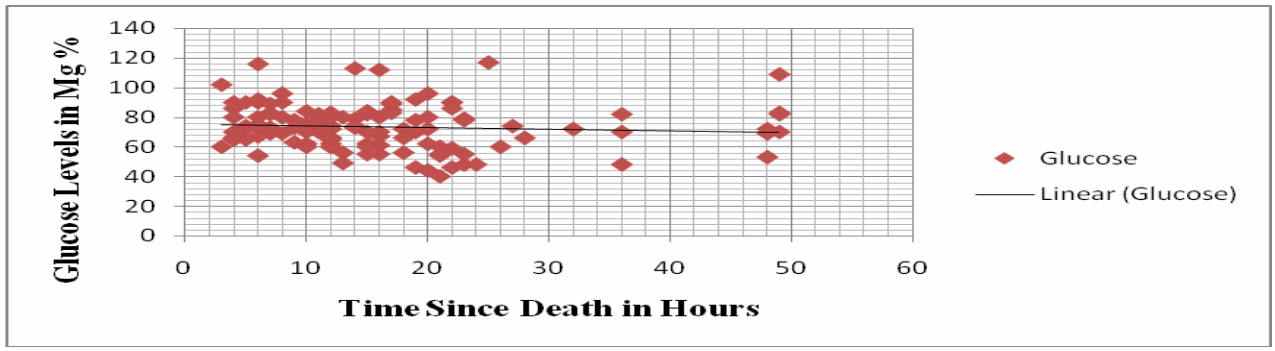
ANOVA Sodium								
	df	***SS***	***MS***	***F***	***Significance F***			
Regression	1	280.89716	280.89716	2.442913	0.1206671			
Residual	121	13913.022	114.98365					
Total	122	14193.919						
	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0 %***	***Upper 95.0%***
Intercept	11.441383	2.9938035	3.8216879	0.0002108	5.514359	17.368406	5.514359	17.36841
X Variable	0.0441633	0.0282557	1.5629879	0.1206671	-0.0117763	0.1001029	0.0117763	0.100103

Table 4: The descriptive statistical analysis of variable (ANOVA) Glucose.

ANOVA Glucose								
	df	***SS***	***MS***	***F***	***Significance F***			
Regression	1	306.9167	306.9167	2.674222	0.104584			
Residual	121	13887	114.7686					
Total	122	14193.92						
	Coefficients	**Standard Error**	**t Stat**	**P-value**	**Lower 95%**	**Upper 95%**	**Lower 95.0 %**	**Upper 95.0 %**
Intercept	23.62829	4.841635	4.880229	3.27E-06	14.043	33.21358	14.043	33.21358
X Variable	-0.1062	0.06494	-1.6353	0.104584	-0.23476	0.022369	-0.23476	0.022369

Fig. 2 Scatter diagram depicting the relationship in Sodium level and time since death (PMI).

Fig. 3. Scatter diagram depicting the relationship in Glucose level and time since death (PMI).



As seen from the scatter diagram it is observed that there is no linear relationship exists between glucose, sodium and time since death. The attempt was made to look for any relationship present, in mathematical form by applying regression analysis. Sodium and Glucose do not have any positive correlation with time lapse and hence no definite formulae or equation could be evolved in relation to estimate time since death.

Discussion

In many medico legal cases, there is need to know the approximate time of death. Exact chronologies of post-mortem changes do not and cannot be expected to exist. Therefore, there is need for laboratory test, which is simple and yet can provide a dependable range of accuracy. There has been persistent endeavour to arrive at a conclusion with a reasonable accuracy by applying different method available at hand at different times 6.

While age-old conventional methods of changes, holds good for estimation of time of death during routine medico legal autopsies, newer methods are being explored until today. The post-mortem chemical examination of body fluid is restricted to compartment which are not as much exposed to autolysis and putrefaction as blood 3, 11. Another possible compartment is the joint cavity of the knee from which synovial fluid can be taken out in sufficient quantity by puncturing the joint.

The study of various parameters in synovial fluid by Moro D.S and Arryo M. C; 1985, like glucose, urea, nitrogen, uric acid, total protein, albumin, alkaline phosphatase, lactic acid dehydrogenase and GOT in relation to cause of death and observed that biochemical parameters of synovial fluid were modified although this modification is related more directly to the duration of pathological process that leads to death than with the nature of the process itself.

Burkahrd Madea et al (2001) studied both synovial fluid and vitreous humour, aim was to compare in both fluid. Potassium, natrium, chloride, calcium, creatinine, glucose, urea were analyzed, potassium concentration in synovial

fluid showed little bit higher than vitreous humour but both compartment fluid showed an increasing potassium concentration in a nearly parallel course.

Sahoo P.C; 1998 studied on 84 cases and showed synovial potassium a steady rise up to a maximum 48 hours of death.

We tried to study and correlate the effect of age, sex, cause of death over concentration of glucose and sodium in relation with time since death. We concluded that there is no effect of age, sex and cause of death over concentration of glucose and sodium ion with time since death ($P>0.06$, $P>0.05$)

Conclusion

The level of sodium and glucose in cadaveric synovial fluid has irregular change with increase in time since death and there is no significant correlation exist for sodium and glucose in relation to time since death and no definite equation could be evolved with no effect of age, sex and cause of death over concentration of glucose and sodium ion with time since death.

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Ethical Consideration in Doctor Patient Relationship

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Abstract

In the present context of commercialized medical practice, there is a strong public feeling that doctors have become traders. Doctors, on the other hand, have reacted in a contradictory manner. Some have found the label 'trader' offensive and refuse to participate in any debate on the subject. Others have accepted that a large part of present day medical practice is nothing, but trading by qualified as well as non-qualified medical persons

Keywords

Ethics, Doctor Patient Relationship, Consent ,Medical Negligence.

Introducation

Ethics

Moral principles that govern a persons behavior. Rules of conduct based on moral principles which are framed by a recognized association are called 'Code of Ethics'.

Medical Ethics

Moral principles that should guide members of medical profession in their dealings with patient, state and each other.

Code of Ethics

The various codes of medical ethics are –

1) Charak's oath

2) Hippocratic oath

3) Declaration of Geneva

4) International code of Medical Ethics

Charak's Oath: - In eighth century B.C. famous ancient Indian physician –CHARAK- laid down an oath that was administered to students, teachers & vaidyas.

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Hippocratic Oath

Hippocrates (460 B.C. to 377 B.C.) Practised Medicine in Island of Cos in Greece. Hippocrates knows as father of western medicine. This oath is still administered to Doctors in many parts of word.

Declaration of Geneva

This oath was accepted by Word Medical Association at Geneva in 1948 & was amended by W.M.A. in August 1968 in Sydney: It is followed by M.C.I. as Code of Ethics.

Declaration to be made by Doctors in India at time of Registration

1) I solemnly pledge myself to devote my life to service of humanity.
2) Even under threat I will not use my knowledge contrary to the law of humanity.
3) I will maintain utmost respect to human life from the time of conception.
4) I will not permit consideration of religion, race, social status or politics to intervene between my duty to wards patient.
5) I will practice my profession with conscience & dignity.
6) The heath of my patient will be my first consideration.
7) I will respect the secrets which are confined in me.
8) I will give to my teachers the respect and gratitude which is their due.
9) I will maintain by all means the honour and noble tradition of medical professor.
10) I will treat my colleges with respect & dignity (treat them as my brothers)

I make these promises solemnly, freely and upon my honour.

The above declaration is to be read and then signed by a Doctor at time of Registration before Registrar of Medical Council.

Doctor Patient Relationship

Are as old as medical profession. When a doctor agrees to treat a patient, the two parties enter into a contract and 'Doctor Patient Relationship is established. The relationship may be expressed or implied because of which they have some duties /obligation to each other.

Duties of Doctor towards Patient:

- To exercise reasonable degree of skill & care.
- To maintain professional secrecy in regard to patients disclosures before doctor.
- To provide quality treatment.
- To attend the patient
- To take proper consent
- Continuation of treatment
- Referrals / Consultations.

Exceptions to professional Secrecy – Privileged Communications

- In Court of Law.
- Duty towards state.
- Crime under section 202 of I.P.C.
- Insurance Reports
- Duty towards Society.

Duties of Patient towards doctor

- To carry out instructions of doctor
- To provide all possible information
- To pay doctor's fees/payments.

Medical Negligence (Medical Malpractice or Malpraxis)

Def:-It is defined as the omission to do something (Act of omission) which a reasonable professional would do, or doing something (Act of commission) which a reasonable professional would not do.

Types

1) Civil Negligence

2) Criminal Negligence

Civil Negligence:- Kind and degree of negligence is such that it gives a right to patient for compensation. The onus of proving negligence rests on the plaintiff.

Criminal Negligence:- Gross negligence that shows utter disregard for life & safety of others in a manner that amounts to crime against the state. Which is punishable under Criminal Law Section 304 – A of I.P.C (Rash or negligent act not amounting to culpable homicide).

Essential Conditions to prove Negligence

Liability for negligence arises only where all the conditions mentioned below are satisfied in that particular case.

- Duty to care
- Dereliction or breach of duty
- Damage
- Direct relation between doctors conduct & damages.
- Damages that resulted must be reasonably fore seeable.

Multiple actions by different agencies against a doctor for negligence.

1) By State under Criminal Law
2) By Medical Council for misconduct
3) By department – Govt. or Private organization
4) In Civil Court for damage.

Defences against Negligence

- Denial of duty of care
- Duty performed in accordance with prevailing standard.
- Therapeutic misadventure – "Misadventure is defined as an unfortunate incident that might result in injury or death accidentally, while performing a legal act without negligence or intent to harm".
- Error of Judgment
- Contributory Negligence
- Valid informed consent
- Doctrine of Resjudicata.
- Time limit to file case. (within 2 years of incident).

Legal Interpretation of Medical care as service

Supreme Court of India has held in Indian Medical Association case that following aspects of medical care were affected by the provisions of Consumer Protection Act – 1986

Service rendered to patient by a doctor (except where service is rendered free of change to every patient) by way of consultation, diagnosis and treatment both medical and surgical would fall with in the ambit of service as defined in section 2(1) of the Consumer Protection Act-1986.

Health care Institutions have been divided in three groups

- Where services are given free of cost to all.
- Charges are paid by all patients for services provided.
- Charges are paid by some patients and some category of patients, who cannot pay are rendered free service.

Different type of courts to deal case under consumer protection Act – 1986.

- District forum.
- State Commission
- National Commission

Vicarious Liability

In law it means that a person becomes liable to pay damages for an act of negligence committed by his servents or agents in the course of their employment. The person who is responsible is know as – Respondent Superior.

Negligence in a Hospital or Nursing Home

Doctor may be held responsible for negligent act of third party i.e. a nurse or theatre assistant, if act was done in his presence. (Under civil law but not under criminal law).

Doctrine of Corporate Liability

Hospital authorities are responsible for negligence of doctors / Nurses – To prove corporate liability the plaintiff has to prove that hospital authority was aware that doctor alleged of negligence was providing substandard care & treatment.

Infamous Conduct or Professional Misconduct

Such a conduct of doctor which is considered disgraceful or dishonorable by professional collogues of good repute & competency.

Power to take action

M.C.I. or state medical council

What amounts to infamous conduct

- Adultery or improper conduct or association with patient.
- Conviction by court of law
- Issuing fake certificates
- Selling poisons to public
- Employing unqualified persons
- Advertising
- Fee splitting or Dichotomy
- Abortions &
- So many other conditions

Punishment for Infamous Conduct:

Professional death sentence

Consent:

Agreement to accept consequences of an action. Also defined as 'Voluntary agreement, compliance or permission'.

Consent in Medicolegal Cases

\Consent is required for examination of all medicolegal cases except where a person is in police or judicial custody.

- Section 53 of Cr.P.C.
- Section 54 of Cr.P.C.
- Section 88,89,90,&92 of I.P.C.

Consent of Spouse

- Routine examination
- Operations
- Treatment resulting to impotence & sterility
- In relation to M.T.P. Act – 1971

Doctors Responsibility in Criminal Matters

Under section 202 of I.P.C. a person should at once communicate to the police any information about a criminal act. But in case of a doctor there is discretion left to doctor.

Summary

In any relationship between two persons or parties problems or disputes are going to arise. Doctor should do what is in the best interest of patient. Medical profession is progressing rapidly so a doctor has to keep his knowledge upto date.

"Treat a patient in a way as you would wish others to treat you if you were patient". In my experience conduct & behaviour of a doctor make the difference between a Good Doctor & not so good Doctor. Professional competence, knowledge of duties and law & good conduct and behaviour will minimize disputes in this relationship.

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News and Events

May 28–30, 2009
International Academy of Legal Medicine,
Annual Congress
Fundação Calouste Gulbenkian, isbon, Portugal
Contact: National Institute of Legal Medicine,
Web site: http://www.ialm.info

1st June 2009 till 5th June 2009
6th ISABS Conference on Human Genome Project Based Applications in Forensic Science,
Anthropology and Individualized Medicine
Contact Person: Maja Radnic, Web Site: www.isabs.hr

June 1–5, 2009
International Society for Applied Biological Sciences (ISABS) Conference on Human Genome Project-Based Applications in Forensic Science, Anthropology, and Individualized Medicine, Hotel Le Méridien Lav, Split, Croatia
Contact: ISABS,
Web site: http://www.isabs.hr/

June 8–12, 2009
Basic Bloodstain Pattern Analysis Course, Elmira College, Elmira, New York
Contact: Paul E. Kish
Outdoor Recovery Course,

June 8–12, 2009
Forensic Anthropology Center, University of Tennessee Knoxville, Tennessee
Contact: Rebecca Wilson, E-mail: fac@utk.edu

June 8–12, 2009
Advanced Bloodstain Pattern Analysis Course
Elmira College, Elmira, New York
Contact: Paul E. Kish
E-mail: paulkish@stny.rr.com

June 15–19, 2009
Examination of Forensic, Trace Evidence Particles
McCrone Group's College of Microscopy,
Westmont, Illinois
Contact: Chuck Zona,
Web site: http://www.collegeofmicroscopy.com

July 13–17, 2009
Human Identification in Forensic Anthropology,
Forensic Anthropology Center, University of Tennessee, Knoxville, Tennessee
Contact: Rebecca Wilson, E-mail: fac@utk.edu

July 20–24, 2009
Taphonomy in Forensic Anthropology,
Forensic Anthropology Center
University of Tennessee, Knoxville, Tennessee
Contact: Rebecca Wilson, E-mail: fac@utk.edu

July 27–30, 2009
Masters Conference St. Louis University School of Medicine, Division of Forensic Pathology,
St. Louis, Missouri
Contact: Mary Fran Ernst or Julie Howe,
Web site: http://medschool.slu.edu/masters

July 27–31, 2009
Modern Polarized Light and Chemical Microscopy
McCrone Group's College of Microscopy,
Westmont, Illinois
Contact: Chuck Zona,
Web site: http://www.collegeofmicroscopy.com

August 2–7, 2009
Trace Evidence Symposium
Sponsored by the FBI Laboratory and the National Institute of Justice.
Web site: http://www.ojp.usdoj.gov/nij/events/welcome.htm

August 10–14, 2009
Medicolegal Death Investigator Training Course
St. Louis University School of Medicine
Div of Forensic Pathology, St. Louis, Missouri
Contact: Mary Fran Ernst or Julie Howe,
Web site: http://medschool.slu.edu/mldi

Body-Fluid Identification
McCrone Group's College of Microscopy,
Westmont, Illinois
August 18–20, 2009
Contact: Chuck Zona,
Web site: http://www.collegeofmicroscopy.com/

September 14–18, 2009
Basic Facial Reconstruction, Sculpture Workshop
University of Oklahoma, Norman, Oklahoma
Contact: Betty Pat. Gatliff,
Web site: http://www.sculpture.outreach.ou.edu/

September 21–25, 2009
Advanced Facial Reconstruction, Sculpture Workshop
University of Oklahoma, Norman, Oklahoma
Contact: Betty Pat. Gatliff,
Web site: http://www.sculpture.outreach.ou.edu/

September 21–25, 2009
Forensic Soil Examination
McCrone Group's College of Microscopy,
Westmont, Illinois
Contact: Chuck Zona,
Web site: http://www.collegeofmicroscopy.com/

September 23–26, 2009
World Congress
International Society for Forensic Genetics,
Hilton Hotel Buenos Aires, Argentina
Contact: Analia Procupez, + 5411-4378-1128 (Voice)

October 5–9, 2009
Scanning Electron Microscopy
McCrone Group's College of Microscopy,
Westmont, Illinois
Contact: Chuck Zona,
Web site: http://www.collegeofmicroscopy.com/

October 12–14, 2009
Particle Isolation,
Manipulation and Mounting
McCrone Group's College of Microscopy,
Westmont, Illinois
Contact: Chuck Zona,
Web site: http://www.collegeofmicroscopy.com/

October 18–23, 2009
Joint Meeting of the Southern Association, Mid-Atlantic Association, Midwestern Association, and Southwestern Association of Forensic Scientists (SAFS), (MAAFS), (MAFS), and (SWAFS), Wyndham-Orlando, Orlando, Florida
Contact: Emily Varan,
Web site: http://www.maafs.org/2009jointmtg.htm

October 19–23, 2009
Identification of White Powder Unknowns
McCrone Group's College of Microscopy,
Westmont, Illinois
Contact: Chuck Zona,
Web site: http://www.collegeofmicroscopy.com/

November 4–6, 2009
Raman Microscopy
McCrone Group's College of Microscopy,
Westmont, Illinois
Contact: Chuck Zona,
Web site: http://www.collegeofmicroscopy.com/

November 4–7, 2009
Annual Meeting of the Northeastern Association of Forensic Scientists (NEAFS)
Ocean Place Resort and Spa, Long Branch, New Jersey
Contact: Laura Tramontin ,
Web site: http://www.neafs.org/annualmeeting/annmeeting.htm

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