Endoscopic Length Between Incisors to Gastro –Oesophageal Junction
Compared to External Parameters among Patients at Wad Medani
Teaching Hospital,
Gezira State, Sudan (2017)

Osman Ali Osman Ali
MBBS University of Gazira (2013)

A Dissertation
Submitted to the University of Gezira in Partial Fulfillment of the Requirements
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in
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Department of Anatomy
Faculty of Medicine

January 2018
Endoscopic Length Between Incisors to Gastro–Oesophageal Junction Compared to External Parameters among Patients at Wad Medani Teaching Hospital, Gezira State, Sudan (2017)

Osman Ali Osman ALi

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Date: June 2017
Endoscopic Length Between Incisors to Gastro – Oesophageal Junction Compared to External Parameters among Patients at Wad Medani Teaching Hospital, Gezira State, Sudan (2017)

Osman Ali Osman Ali

Examination Committee:

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Date of examination: 16.7.2018
Dedication

This work is dedicated to my dear’s

My family

My Friends

My supervisors

My patients

Staff at endoscopy department
Acknowledgements

Firstly praise be to Allah; the Lord and Creator for his generous bounties. Secondly Special thanks and gratitude to my supervisors; Dr. Mohamed Abdusalam Nurein, this wise man who offered me expert valuable advices, support and scientific guiding.

More over my gratitude to Dr. Mohammed Ibrahim Mohamed for his caring, professional guiding and support of my work.

In particular I would like to thank Dr. Mohamed Al-Mahdi Ali Saleh for his encouragement and supplying me with his opinions.

My thanks also for the staff members of the endoscopy clinic at Wad madani teaching hospital especially the nursing staff.

I am also so indebted to my patients wishing them all the best.
Endoscopic Length Between Incisors to Gastro–Oesophageal Junction Compared to External Parameters among Patients at Wad Medani Teaching Hospital, Gezira State, Sudan (2017)

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Abstract

The study was carried out at Wad Madani Teaching Hospital endoscopy department among patients of diagnostic or therapeutic upper GIT endoscopy. Nowadays there is increasing awareness of medical staff about the importance of diagnostic upper GIT endoscopy, and there is an increasing incidence of upper GIT instrumentation. The study is aimed to compare the length between incisors to gastro–oesophageal Junction which is determined by the endoscopy and compare it with the surface external parameters (height, BMI, the distance from the nose–ear–xiphoid process (NEX), and the mento–xiphoid length. Firstly measurements of the external parameters, then measurements of the distance between incisors to gastro–oesophageal Junction by endoscopy was done. And then I correlate and investigate for the most approximately identical external parameter measure to the length of the upper GIT which is detected by endoscopy. Data were recorded using tables and classify as grouped from 77 candidate. The results was statistically significant and there was positive correlation between the length which is detected by endoscopy and the height of the candidate and negative value regard the BMI, and there was statistically significance when we compare the NEX length and the Mento-xiphoid length to the length of upper GIT which is detected by endoscopy. And the most closest one in the adult is NEX length. And that, the mean length of the upper GIT can be estimated by external parameters.
قياس المسافة من الأسنان إلى ملتقي المرئ والمعدة بالمنظار ومقارنتها مع المعلمات الخارجية في مرضى المناظير بمستشفى ود مدني التعليمي 2017

دراسة مناظير

عثمان علي عثمان علي

ملخص الدراسة

تم إجراء الدراسة في مستشفى ود مدني التعليمي قسم المناظير. تمت في المرضى بالقسم الذين عمل مناظر علوي لهم بغرض التشخيص أو العلاج. نسبة لارتفاع مستوى الوعي على نطاق الكوادر الطبية بأهمية تنظير الجهاز المعدي العلوي لما له من أهمية تشخيصية، وزيادة نسبة استعمال الأجهزة والمعدات للجهاز المعدي العلوي كان الغرض من هذه الدراسة معرفة المسافة من الأسنان إلى ملتقي المرئ والمعدة وذلك عن طريق المنظار وعمل مقارنة مع المعلمات الخارجية للجسم مثل الطول والوزن وحجم الكتلة والمتوسط من الأنف إلى الأذن ومن الأذن إلى منطقة البروز الخنجري، ومسافة من منتصف الفك السفلي إلى البروز الخنجري. يتم قياس المعلمات الخارجية وهي الطول والوزن وحجم الكتلة وقياس المسافة من الأنف إلى الأذن ومن الأذن إلى البروز الخنجري، وقياس المسافة من منتصف الفك السفلي إلى البروز الخنجري. وبعد ذلك عن طريق المنظار يتم قياس طول المسافة من الأسنان إلى ملتقي المرئ والمعدة. تم تسجيل البيانات وتصنيفها في جداول. وكان عدد المشاركين 77 مشترك. النتائج كانت ذات دلالة إحصائية إيجابية في ما يخص طول المرئ وسلبية في ما يخص حجم الكتلة للمريض. ودالة إحصائية إيجابية في ما يخص المسافة من الأنف إلى الأذن ومن الأذن إلى البروز الخنجري ومسافة من منتصف الفك السفلي إلى البروز الخنجري. وكانت المسافة من الأنف إلى الأذن ومن الأذن إلى البروز الخنجري في البالغين هي الأقرب للطول عن طريق المنظار. وهذا يعني أنه طول الجهاز المعدي المعدي العلوي يمكن التنبؤ به عن طريق المعلمات الخارجية للجسم.
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Chapter one:
Introduction:

1.1.1 Upper GIT Endoscopy:

Endoscopy is a procedure in which a flexible tube is introduced through the mouth or, more rarely, through the nares and into the esophagus to visualize the esophageal mucosa from the upper esophageal sphincter all the way to the esophagogastric junction (EGJ) (“Dorling Kindersley 1990“. The endoscope uses a charge-coupled device to display magnified images on a video screen. The procedure allows, gastroscopy, esophagogastrroduodenoscopy (EGD), and enteroscopy. “Manhas S, 2015“

1.1.2 Indication of Upper GIT Endoscopy:

Upper GIT endoscopy is used for evaluation and management of gastroesophageal reflux disease (GERD), including noncardiac chest pain. “Muthusamy et al. 2015“

Also it is used in screening and surveillance of Barrett esophagus which is pre malignant condition (changes that happen to patients who had recurrent attack of gastro oesophageal reflux disease, “Evans JA, et al 2012“

It is also used to investigate and to control upper GI bleeding such as portal hypertension and other causes of upper gastrointestinal tract bleeding, Upper GIT endoscopy is used very frequently in treatment and surveillance of esophageal varices “Hwang JH et al 2014“

Endoscopy is used in evaluation and management of dysphagia, including dilation of esophageal strictures which are associated with barret oesphagus “Pasha SF, et al 2014“.

Increasing the incidence of malignancy world wide, it is used for evaluation and management of esophageal cancer, including placement of esophageal stents (which is used temporary to improve the condition of patient with advance oesophageal cancer “Evans JA, et al 2013“
1.2 Anatomy of Upper Gastro-Intestinal tract:

Upper GIT is defined from the oral cavity to the second part of the duodenum, this definition was taken from the embryologic site of view, and there are many definition regarding the upper GIT.

1.2.1 Oral cavity:

The oral cavity proper is the space between the upper and the lower dental arches or arcades (maxillary and mandibular alveolar arches and the teeth they bear). The oral cavity is limited laterally and anteriorly by the dental arches. The roof of the oral cavity is formed by the palate. Posteriorly, the oral cavity communicates with the oropharynx (oral part of the pharynx). When the mouth is closed and at rest, the oral cavity is fully occupied by the tongue. ”P. Hazarika et al 2009”

Dimension of the mouth varies according to the size of the tongue and the status of the teeth and status of hard palate.

1.2.2 Pharynx:

Throat (pharynx) is a muscular tube and positioned in front of bodies of the cervical vertebrae from the base of the skull to the cervical vertebra level VI, which goes into the esophagus. The length of the pharynx is 12-15 cm. In addition, the air passes from the throat of the nasal cavity and vice versa “Drake, et al 2005.”

1.2.3 Esophagus:

The esophagus is a 25-cm long muscular tube that connects the pharynx to the stomach. “Colledge, et al 2010”

The length of the esophagus at birth varies between 8 and 10 cm and measures about 19 cm at age 15 years, The esophagus extends from the lower border of the cricoid cartilage (at the level of the sixth cervical vertebra) to the cardiac orifice of the stomach at the side of the body of the 11th thoracic vertebra. The upper limit in the newborn infant is found at the level of the fourth or fifth cervical vertebra, and it ends higher, at the level of the ninth thoracic vertebra. “Drake, et al 2005”

Length of the upper gastro-intestinal tract is varies according to many variables such as height, gender, and disease. the length of instruments which is used usually such as naso gastric tubes and oro gastric tubes and the manithota tube
which is used for stopping the upper gastro intestinal tract bleeding due to oesophageal varices.

All these instruments length is made according to cadaveric length of the upper GIT, which may be affected by the post mortem changes, so the length of these instruments is limited.

So it is necessary that to detect the variation in distance between the incisors and gastro-oesophageal junction from one person to another according to parameters which is easy to be measured and to avoid the complication that is suspected from upper GIT instrumentation.

This study tended to establish relation between measures of the length of upper GIT from anterior incisors to gastro oesophageal junction compare to external surface land marks.

1.3 Justification and aim of study:

To our knowledge the reported data about the distance between incisors and gastro-oesophageal junction and its correlation to external parameters is few, a growing indication for upper gastro-intestinal tract endoscopy is reported.

In addition to this, data about the length of upper gastro intestinal tract from incisors to gastro-oesophageal junction is may be influenced by many factors such as the height, weight, gender, and BMI.

The study is justified since it trie to establish preliminary data for the length from incisors to gastro-oesophageal junction, by upper GIT endoscopy and to compare it with external land marks and making a correlation between these readings.

1.4 Objectives:

1.4.1: General objectives

To match the length of the distance between the teeth and gastro-oesophageal junction measured by endoscopy with the distance between symphysis-menti and the xiphoid process, and the distance between the tip of the nose to the ear and xiphoid process which is measured externally by a tape.

1.4.2 Specific objectives:

1- Measure the length between the anterior incisors and gastro oesophageal junction by endoscopy.
2- Measure the length of the distance between the symphysis menti and xiphoid process while the tape is adherent to skin in resting position of the neck.

3- Measure the distance between the tip of the nose to the lower end of the pinna of the ear and then from the later to the xiphoid process.

4- correlate the measured lengths with each other and with height, BMI.
Chapter two
Literature review:
The textbook length of the upper GIT length and oesophageal length varies, Esophageal length is known to vary from person to person, across age and gender groups (Song et al., 1991; Yang et al., 2005).

Cunningham (1902) observed that the length of the oesophagus varies in different individuals from 20 to 35 cm, the distance from the upper incisors to the beginning of the oesophagus averages 15 cm, and the breadth varies between 13 mm in the empty contracted state to 30 mm in the fully distended condition.

At endoscopy the usual length is 40 cm, measured from the incisor teeth to the point where the mucosal change occurs. "Kalloor, 1976".

- Appendix (Figure 2.1: Distance from anterior incisor to gastro-oesophageal junction (Union for International Cancer Control (UICC), Geneva, Switzerland. Wittekind et al. (2005).

Observations on oesophageal length reported by "Kalloor 1976" when he measured the oesophageal length by the use of the external chest measurement, that is, the distance between the lower incisor teeth and the xiphisternum, measured with the neck fully extended, and its validity tested by internal measurements. The findings of this study demonstrated that the external chest measurement provides a means of assessing the true static length of the oesophagus, corrected for the size of the individual.

*Appendix (Figure 2.2) : The method which followed by G. J. Kalloor, A. H. deshpande, and J. leigh collis)

All the candidates had normal upper GI. The results showed the external measurement varied between (45) cm and (34) cm with a mean of 39-2 (SD±3-1).

The internal length varied between 45 cm and 33 cm with a mean of 39-2 (SD ±3 -3).

In another endoscopic study, which was cross sectional study confined to the length of the oesophagus, the mean esophageal length was 22.2 ± 2.63.

The esophageal length has a negative correlation with weight of individual and body mass index. There was a positive correlation between esophageal length and height of the individual and the sternal length. The Individual’s height is the parameter that best correlates with the esophageal body length. "Kaisha et al 2011"
A lot of observation to the difference to the length of the upper GIT, i.e. the distance from the incisors to the esophago-gastric junction, varies in different individuals from 32 to 50cm. "Williams and Warwick; 1980", "Netter FH. 1979"

Detecting the length by endoscopy of adult esophagus is measured as 40 cm from the incisor to the point where mucosal change occurs "Jo SR 1987"

The external measurement usually reported such as nose, ear, xiphoid length (NEX method) which is used frequently at pediatric hospitals to approximate the length of the upper GIT on neonates and childs "Beckstrand, Ellet, McDaniel. 2007" "Ellett, Croffie, et al, 2005". And even this method was found to have a margin of error which is evidenced by research "Adamson, 1978"

Length vs Sex. The male esophagus was relatively longer than female with a mean length of 22.7 ± 1.84, compared to a female mean length of 21.6±3.32). This difference was just short of statistical significance p= 0.076. "Kaisha et al 2011"

Most studies did not find any correlation between esophageal length and weight "Yang et al 2005".

According to my searching about the length of distance between the incisors to gastroesophageal junction I did not find any similar study at the level of Africa or locally at the level of Sudan.

Even the last paper is found at 2011, so it is a rich area for another studies to be carried out.
Chapter three:
Material and methodology:

3.1 Study area:
The study was conducted at Wad Madani Teaching Hospital, this hospital is a well equipped and contains 14 units varies between surgery and medicine specialties, located in Wad Medani town the capital of Gezira state, This strategic location make the center provide its services for very large area in the country from eastern, south, and middle states and also for some western and southern states. The staff is headed by specialized endoscopic physicians and surgeons and include, registrar of medicine and surgery, medical residence & house officers.
The endoscopy department is well equipped and contain 20 beds and have trained nurses and staff.

3.2 Population of the study:
The population of the study were patients who came from different parts of sudan, Patients attended the endoscopy department at wad Madani teaching hospital for diagnostic or therapeutic purpose since period February to June 2017.

3.3 Data collection:
Call for participation was announced at the endoscopy department Personal data were obtained using data collection form by the researcher and trained nurse, after patients being consented.
Measuring the parameters was done (height, weight).
Patients were up right position with mild extension of the neck measuring the length from the mid point of the mentum (symphesis menti) to the mid point of the neck (cricoid cartilage), then from the cricoid cartilage to the junction of the neck and the body (jugular notch), then from the notch to the xiphoid process. All these measures done by non elastic tape.
Then the patient turn his head to the right side of the body at equivocal position (neither flexion nor extension) measuring from the nose to the pinna of the ear and from the ear to the xiphoid process.
For measurement of endoscopic length the patients positioned at left lateral position after sedation and librecation then the scope is inserted. The length of the endoscopy from the anterior incisors to the lower oesophageal sphincter was measured by the specialist of endoscopy.

3.4 instruments:
endoscopy(\textit{Olympus 180 video scope made in Germany})

3.5 Component of endoscopy device:
Appendix( parts of endoscopy.)

Endoscopy is composed of long fibro-optic tube which is connected to visual screen, and video processor, and it had a light source which is controlled according to the need of the operator.

The device had the control head which allow the operator to mobile the device freely. It had many port sites, and the main use of these ports, include biopsy taking, and in ligation of oesophageal varices.

3.6 Study design:
This is a cross sectional descriptive hospital based study that was conducted at 2017.

3.7 Sample size:
It was convenient sample taken (77).

3.8 Inclusion criteria:
All patients attending the upper GIT endoscopy clinic with apparent healthy oesphogus from February to June 2017 who accepted to participate.
3.9 Exclusion criteria:
Patient refusal.
Un passable eosphgeal tumors.
Bed ridden patients.

3.10 Data analysis:
Data was collected categorized, coded and entered in Excel for windows and using Statistical Package for Social Sciences program (SSPS) version (24) was used for analysis.

3.11 Patient consent:
Informed Consent was obtained from patients after explanation of the procedure and they had all the rights to withdraw their acceptance at any time. and acceptance or refusal will not affect the management.

3.12 Ethical consideration:
ethical approval from research ethics committee of the University of Gezira was obtained.
Chapter four
Results and discussion:

4.1 Results:
The results of this study were presented in form of figures and tables.

Figure 4.1.1: Gender Distribution of patients attending Wad Madani Endoscopy Clinic (2017).

Figure 4.1.2: Distribution of study Population by age groups, Wad Madani teaching hospital (2017)
Figure 4.1.3: The distribution of study population by body mass index at Wad Madani teaching hospital (2017)

Table 4.1.1: Comparison between the means of Mento-xiphoid length, NEX length and length by endoscopy in Cms:

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
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<tr>
<td>Mento-xiphoid length</td>
<td>38.03 cm</td>
<td>3.784</td>
</tr>
<tr>
<td>NEX</td>
<td>49.13 cm</td>
<td>3.840</td>
</tr>
<tr>
<td>Endoscopic length of upper GIT</td>
<td>38.00 cm</td>
<td>3.082</td>
</tr>
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Table 4.1.2: Comparison between the Length by Endoscopy and BMI:

<table>
<thead>
<tr>
<th>BMI</th>
<th>Means(length by endoscopy)</th>
<th>St D</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 18.5</td>
<td>37.5 cm</td>
<td>3.0</td>
<td>0.143</td>
</tr>
<tr>
<td>18.5 – 24.99</td>
<td>38.2 cm</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>25 – 29.99</td>
<td>38.3 cm</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>&gt;30</td>
<td>38.3 cm</td>
<td>1.3</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.1.3: Comparison between the Length by Endoscopy and Height groups:
Table 4.1.4: Comparison between the Mento xiphoid length and Height groups:

<table>
<thead>
<tr>
<th>Height Groups</th>
<th>Means (length by endoscopy)</th>
<th>Std</th>
<th>P value</th>
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<tbody>
<tr>
<td>130-155 cm</td>
<td>35.2 cm</td>
<td>2.2</td>
<td>0.002</td>
</tr>
<tr>
<td>156-180 cm</td>
<td>38.3 cm</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>&gt;180 cm</td>
<td>39.3 cm</td>
<td>2.3</td>
<td></td>
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Table 4.1.5: Comparison between the Mento xiphoid length and BMI:

<table>
<thead>
<tr>
<th>BMI</th>
<th>Mean (mento-xiphoid)</th>
<th>Std</th>
<th>P value</th>
</tr>
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<tbody>
<tr>
<td>&lt; 18.5</td>
<td>36.9 cm</td>
<td>4.1</td>
<td>0.038</td>
</tr>
<tr>
<td>18.5 – 24.99</td>
<td>38.2 cm</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>25- 29.99</td>
<td>39.3 cm</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>&gt;30</td>
<td>39.3 cm</td>
<td>1.7</td>
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Table 4.1.6: Comparison between the NEX length and Height groups:

<table>
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<th>Std</th>
<th>P value</th>
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<tr>
<td>130-155 cm</td>
<td>46.5 cm</td>
<td>4.5</td>
<td>0.000</td>
</tr>
<tr>
<td>156-180 cm</td>
<td>48.9 cm</td>
<td>2.9</td>
<td></td>
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<tr>
<td>&gt;180 cm</td>
<td>54.1 cm</td>
<td>3.9</td>
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Table 4.1.7: Comparison between the NEX length and BMI:

<table>
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<th>Std</th>
<th>P value</th>
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</thead>
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<td>&lt; 18.5</td>
<td>48.7 cm</td>
<td>5.0</td>
<td>0.046</td>
</tr>
<tr>
<td>18.5 – 24.99</td>
<td>49.8 cm</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>25 – 29.99</td>
<td>48.5 cm</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>&gt;30</td>
<td>48.8 cm</td>
<td>4.7</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.1.8: Comparison between the length by Endoscopy and the Mento-xiphoid length:

<table>
<thead>
<tr>
<th>Method</th>
<th>Mean (cm)</th>
<th>SD</th>
<th>P.value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mento-xiphoid length</td>
<td>38.03 cm</td>
<td>3.784</td>
<td>.020</td>
</tr>
<tr>
<td>length by Endoscopy</td>
<td>38.00 cm</td>
<td>3.082</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.1.9: Comparison between the length by Endoscopy and NEX length:

<table>
<thead>
<tr>
<th>Method</th>
<th>Mean</th>
<th>SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nose –ear-xiphoid</td>
<td>49.13 cm</td>
<td>3.840</td>
<td>.008</td>
</tr>
<tr>
<td>Length by Endoscopy</td>
<td>38.00 cm</td>
<td>3.082</td>
<td></td>
</tr>
</tbody>
</table>
4.2: Discussion:
This is a single hospital-based observational prospective study, which was done at Wad madani teaching hospital at the endoscopy department.

As evidenced from table (4.1.1) the distribution of the population from site of gender is approximately similar, which indicate that the upper gastrointestinal tract disease such as peptic ulcer disease and gastritis and upper GIT malignancy has the same incidence among both gender.

Regard the age group distribution as in table (4.1.2) it was significant that attending patients to the endoscopy clinic of middle age group and this could be due to increasing incidence of the gastritis which is due use of non steroidal anti-inflammatory drugs and smoking habits, and the elder groups because of upper GIT malignancy.

Regarding the correlation between the length between incisors and gastro-oesophageal junction which is measured by endoscopy and the BMI it was found to be statistically not significant and it had \( p \text{ value }=0.143 \) (Table 4.1.2), and this similar to "Kaisha et al 2011" which in his study did not found a correlation between the oesophageal length and the BMI.

Absence of significance could be explained by the facts that the length of structures is related to multi-factorial eg: genetics, while the BMI is not constant.

On the other hand, it is found that there is correlation between the length by endoscopy from incisors to gastro-oesophageal junction and the height of the person which had \( p \text{ value }=0.002 \) (Table 4.1.3) and it is agreed with "KAISHA et al 2011" who had the same finding.

The mento–xiphoid length in the study when it is correlated to the BMI the \( P \text{ value }=0.038 \) (Table 4.1.5) which statistically significant and indicate that the mento xiphoid length is related to the BMI. Also when comparing the mento-xiphoid length to the height interestingly the \( (p \text{ value }=0.000) \) (Table 4.1.4) and that is indicate in a normal person the increasing in the height is associated with increasing in the mento–xiphoid distance.

On the other hand the other measurement is NEX length, and it is found that it had a correlation to the BMI \( (p \text{ value }0.046) \) (Table 4.1.7) which is a narrow statistical significance but when NEX is correlated to the height the \( (p \text{ value }=0.000) \) (Table 4.1.6) and this
statistically significant P value, by so that mean increasing the height of the patient increase the NEX distance.

In comparison of previous study which is done by "Kalloor, 1976" the external measurement varied between (45) cm and (34) cm with a mean of 39-2 (SD±3-1), and this study found the mean 38.03 (3.784 SD).
The internal length varied between 45 cm and 33 cm with a mean of 39-2 (SD ±3 -3) And this study found the mean 38.0 (3.082 SD).
The P value of "KALLOOR, 1976" (0.001) and this study p value is (0.020) Table 4.1.8), but "KALLOOR, 1976" took the distance from the mentum to the xiphoid process directly( appendix figure 2.2) with hyper extended neck and this hyper extension of the neck can not be judge and controlled in all patients and it is affected by the fatty area around the neck and some disease which may affect the extension such as rheumatoid arthritis.

It was found to be the correlation of the means between the length by endoscopy from incisors to gastro-oespheal junction (mean was 38.00 cm) and mento xiphoid length (mean 38.03 cm), with statistically significance of (p Value 0.020) (table 4.1.8)

On the other hand the NEX length (mean 49.13 cm) compared to the mean of the length by endoscopy (38.00) the statistically signefecance (p value = 0.008) (table 4.1.9)

And from this P value indicate that the NEX method in adult is better in comparison to mento–xiphoid length in correlation to distance from incisors to gastro-oespheal junction. Although the NEX method ( nose – ear –xiphoid process), used previously to detect the approximate length of the upper GIT but exclusively on neonates and pediatrics and it showed margin of error by research (Adamson , Ziemer, Carrol, nursery textbook ,1978), in this study we try to apply it on adults and interestingly there was statistically significant difference when we correlate it with the endoscopic length as in table (4.1.9) with ( P value :0.008).
Chapter five
5.1 Conclusion:
In conclusion this study showed significant relation between distance from the incisors to gastro-oesophageal junction which is detected by endoscopy and the (nose – ear – xiphoid ) distance , and mento – xiphoid distance and the height of the person , and it also showed that there is no relation statistically between the length of incisors to gastro-oesophageal and the BMI.

5.2 Recommendations:
Since this study provided a preliminary data , so it is recommended to have a population based study to establish a national data base so that the length of instruments for upper gastro intestinal tract and endoscopy should match the population length especially with increasing needs for these upper GIT instrumentations.
Chapter six
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Union for International Cancer Control (UICC), Geneva, Switzerland . Wittekind et al. (2005)


Appendix
Figure 1.1.3.1: parts of endoscopy.
(Figure 2.1: Distance from anterior incisor to gastro-oesophageal junction (Union for International Cancer Control (UICC), Geneva, Switzerland. Wittekind et al. (2005))

(Figure 2.2) : The method which followed by G. J. KALLOOR, A. H. DESHPANDE, and J. LEIGH COLLIS)