Determining width and Length estimation of Bones in Radiology Images  
(MRI, Radiology and Images without Depth)

Shiva KHOSRAVINIA

MSc in Biomedical Engineering, Amirkabir University of Technology, Tehran, Iran

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Abstract. Bone is an alive and strong tissue which makes the skeletal scaffolding of human body. Bone is a strong base which the other parts are based on it. In many places, bone surrounds the sensitive parts and protects it. Bones are the places for reproducing the red and white blood cells and a good source of minerals, especially Calcium. Whenever body needs them, gives them to body. Body bones are formed from a hard tissue called bony tissue. Histologically, bone is made of connective tissue. Bone has an interior and exterior texture. It is very strong and light. In this research, the ways of Determining width and Length estimation of Bones in Radiology Images have been issued. The present study, have been conducted with the aim to finite element analysis to determine the stress distribution of bone around the implant mandibular prosthesis to the Plans of dimensional change mandible. In this experimental study, Mandibular models using data from CT-Scan body sections 0.5 mm were prepared.

Keywords: Bones, photo, prosthetics, implants

INTRODUCTION

Long since, the structure and function of bone seems to have attracted anthropologists, the bones for centuries, and even in some cases millions of years to stay healthy. Human bone due to its strength in the manufacturing of tools, weapons and art objects used. The bones and the way to achieve physical and cultural anthropologists to evolve humans.

Bones also interesting for the physicist and engineer. Perhaps this is part of the body, the more physicists because it involves issues of engineering problems, such as issues related to the fixed and mobile, standing, walking, running, etc. The nature of these problems it has managed through diversification of the bone tissue of the body and eliminate them from the manufacturer.

Because of the importance of bones in the body to work properly, a number of medical experts, to debate issues of interest to the bone. Two medical specialties, the dental and orthopedic fully dedicated to the field of knowledge of anatomy. Rheumatology and radiology specialists, many of our diagnostic approach, based on X-ray images obtained from bone structures.

At least six of the bones in the body is responsible for:
1. Maintenance
2. Move
3. Protection of various organs

* Corresponding author. Shiva KHOSRAVINIA

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4. Storage of chemicals materials

5. Nutrition

6. Voice transfer

Maintenance of bone in the legs, more than anywhere else you can see the muscles in the body through the tendons and ligaments are attached to bone. This device consists of bones and muscles, keeps the body. Bones and joints to move one bone to another bone provides. The hinges or joints for walking, and many other physical movements are important. Some people can tolerate failure of the joint, but the damage to the joints, the disease caused by inflammation of the joints (arthritis) can severely limit mobility.

Sometimes it is thought that the bone part of the body is almost dead or neutral, and when growth reaches its limit, until death or until the occurrence of an event (eg skiing accidents), does not change. But in fact living bone tissue and blood supply and nervous. Bone tissue is mostly neutral, but it is scattered osteocyte cells. Osteocyte cells are cells that keep bones healthy condition and close to 2% of bone volume up. If these cells die, the bone dies and its strength is reduced. Severe pelvic disease, a condition known as aseptic necrosis that is, the lack of blood in the pelvic bone cells die. The pelvic disease usually cannot work well in some cases and should be replaced with an artificial joint.

Because bone is living tissue, life will be changed. The continuous process of bone aging and old, old building and old bones, and making new bone, the bone model is called modernization, done by a special bone cells. Osteoclasts destroys bone, and osteoblasts make them. Renovation bone model compared to many body processes, activity is slow. Almost "every seven years, our body structure is new, every day osteoclasts part of the bone is close to 5% g calcium spoils and osteoblasts make new bone to use the calcium. When the body is young and growing, osteoblast activity is more than osteoclast, but after 35 to 40 years of age and osteoclasts activities is more as a result, bone mass gradually decreases and the process continues until death.

Decreased bone mineral density in women than men and is clearly cause serious problems with weak bones in older women. This is called osteoporosis and fractures, especially in the spinal and pelvic spontaneous.

1- Bone structure:

Bone, including the underlying bone tissue cells. Background material both amorphous and shaped there. Amorphous matrix contains minerals such as calcium and magnesium phosphate and carbonate, citrate ions, fluoride ions, sodium and potassium. Organic materials include Knrdrvaytn sulfate C and A, a protein called Astyvmkvvyvd and other organic matter that include: osteocaltin, the mineral crystals to collagen linked. Osteocalcin to calcium closes. Sialoprotein protein and bone formation.
Shaped material is collagen. Collagen is a central core of the minerals on their deposits. These compounds produce crystals of hydroxyapatite. Hydroxyapatite bone blade is in the form of concentric circles. In addition, a third substance called collagen fibers together cement that attaches the first, second haversian systems to connect and neatly linked to them. There are four types of bone cells that are not visible at the same time.

**Bone tissue cells**

Osteocytes: these cells are star-shaped and oval nuclei and are filled with chromatin. Each osteocyte is around Lacuna. To prevent cell death, osteocytes cytoplasmic related to each other by a very delicate frills. Osteocytes old bone tissue in areas of deep rough endoplasmic reticulum and the Golgi are with less. As long as not to damage the bone, osteocytes not divided. With the creation of loss, cell division begins. A number of them as osteoblasts, the underlying amorphous form and to become osteocyte bone progenitor cells remain in others.

Osteoblasts, cells of alkaline phosphatase enzyme are abundant and nuclear polygon that is located outside the center of the cell. These cells where construction activity is high and abound, rough endoplasmic reticulum and Golgi apparatus are having. The two shows are secretory activity. That's why many bubbles secretory cells can be seen. During the activity, the number of osteoblasts to bone progenitor cells are stored. These are alkaline phosphatase,

Can make the land and therefore called cells. The cube and basophils activity and at rest, are broad and acidophil (Figure 2.)

**Figure 1. Bone Tissue.**

**Figure 2. Osteoblast cells.**
Osteoclasts from blood monocytes produced. Osteoclasts are responsible for bone degradation in the bone matrix. The role of osteoclasts and osteoblasts photos so called destructive cells. These cells, amorphous material is first ground and then they break down collagen. Usually giant osteoclasts cells with large cytoplasm and nucleus are 6 to 50. Young mononuclear osteoclasts and during activity and at rest acidophil are basophils. The acid phosphate of osteoclasts, cells can degrade the land. In addition, when serum calcium and PTH decreased due to the action of the hormone thyroxin, Osteoclast calcium from bone into the blood stream, and send. Osteoclast bone near the surface of the cavity of the bone are being demolished (Figure 3).

![Figure 3. Osteoclast cells.](image)

**Panoramic radiography and linear tomography in locating canal**

Accurate measurement of the bone to determine the size of the implant is necessary. The surgeon must carefully to achieve the success of various imaging methods have knowledge. The aim of this study was to compare the accuracy of linear tomography and panoramic radiography in determining the vertical spacing and the accuracy of linear tomography in mandibular width estimation. The linear tomography and panoramic radiography in 23 sites of four dry mandible was measured.

**METHODS**

In this study was to evaluate the methods, metal signs crest vertical distances between the head and the upper wall of the mandibular canal and mandibular width were measured in the same tomographic section. Then the bones out of the mark were cut by a chainsaw. The resulting images were compared with actual measurements.

The study was based on the linear tomography in mandibular height more accurate than panoramic radiography. Accuracy of linear tomography in width estimation satisfactory attitude. [1]

**Determine the stress distribution of bone around the implants in the lower jaw**

**Run through different prosthesis when Mandibular- Flexure**

Edentulous mandible patients with fixed implant supported prosthesis issues such as, the number of implants required to complete the reconstruction of the jaw, implants are the right place, dental implants plan for how to connect to each other and the county Lever is discussed. Jaw deformation caused by the movement of forces in the bone around the implant is different, but this is rarely taken into consideration.

We aim to finite element analysis,
Determine the stress distribution of bone around the implant mandibular prosthesis to the Plans of dimensional change mandible. In this case, the mandible using models from CT-Scan Data were collected body sections 5 0 mm, Implant model 10 * 1/4 mm ITI measured using Outlook 2003 Solid works software was developed by Profile Projector. Implants were placed in the jaw in two different designs and three different super structure of the implants were placed.

Clench both incisive and muscle strength and clench right first molar were applied to the muscles and joints. Clench teeth condyle and support were considered. Von Misses stress in the bone surrounding the implant was determined, the lowest level of tension in the Super Tuesday cut structure was observed, the lowest limit dimensional changes in the mandible and three pieces created, acted independently of each other.

This research using more implants for reconstruction of maxillofacial prostheses completely independent of implant to freedom of mandibular dimensional changes recommended [2]

**Compare Bone Caliper accuracy with CT - Scan to determine the width of the alveolar ridge buccolingually remaining patients requiring implant**

The idea implant therapy to replace missing teeth is ideal and accessible. The implant should be at least 1 mm of bone that surrounds the whole idea. For this purpose, knowledge is the essential dimensions of the bone. In this regard, determine the width of the bone is one of the most problematic cases. Ridge Mapping Caliper can be some problems associated with the use of various imaging techniques CT - Scan overcome such. This study aimed to evaluate the accuracy in determining the width of the ridge Bone Caliper compared to CT-Scan was performed.

Diagnostic study on 11 patients admitted to the surgical and prosthetic dental school Shahid Beheshti University of Medical Sciences, Health Services, the applicant implant was performed. For this purpose, a special acrylic Stent was designed to scan and measure the size of the mouth when the preparation is the same. Measure the width of the bone implant 52, between 3 and 6 mm from the edge of the ridge two to one in the mouth and once on CT - Scan was performed. The mean, standard deviation mm (equality mean data) correlation coefficient for total credit and 95% of the time, the site, once for all 3 mm and 6 mm was once a site for the data, a total of 104 measured the size of the mouth of the CT - Scan was performed in 52 implant, the difference between these measurements were not statistically significant. Accordingly, it can be rather Bone Caliper CT - Scan to determine the width of the bone. The simplicity of this technique and the availability of a suitable estimate of the amount of bone present in the clinic to provide clinicians. [3]

**Determine the width and length of bone radiology images (MRI, or radiological or images without depth)**

Background and purpose: Bone precise measurement is necessary to determine the dimensions of the building. To achieve success, the surgeon should have knowledge of the accuracy of various imaging techniques. The aim of this study was to compare the accuracy of linear tomography and panoramic radiography in determining the vertical distances and accuracy of linear tomography in width estimation is within acceptable width estimation.
Knowing how large this view or the distance between the device and Rulvshn pixel image is done. A typical distance between pixels in these images is a 0.4 mm to Inch, but according to varying devices away the pixels on the type of photo and without the interference of random numbers we use the special functions to our attention more and less chance of error, We consider this article as a function of Euclidian distance calculated bones, because of the high computational speed and accuracy of the system is low.

Note that in some photographs of CT scan image quality will be very low as the next page.

Figure 4. Inappropriate photo.

As you watch, the quality is not acceptable for us and we need to picture quality so that we can be more easily found and to this photo, the bone can begin to know, for us the program will use the functions for the program, the functions of our top form after their conversion.
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As you can see the bone and other parts are clearly identified.

We then manually each part that we can select with the mouse and with the approval of the thickness of the desired location in mind.

Program Description

Final.m program running in the command window that asks us to question whether the MRI images measure you give or other images that are not deep, depending on your needs we choose the following options: 1-mri 2-other pic

Note that we must enter the appropriate format, such as below, for example, MRI images will be selected.

In response, a number first and then enter the file name of the image of them. 'brain_001.dcm' we note the two quotes.

We press and Internet.

The above picture will appear.

Double click on the appropriate part so we can know the thickness of the part.
With a great view of the big picture and click I've arrived in the area, in contrast asks whether you accept this position, if you agree, Inter Press, and if not, enter 2 to prepare images for you to choose from. The program takes about 5 seconds to do calculations. After 5 seconds or below occurs earlier. And the distance between selected points with the angles of the display.

Figure 6. The selected image.

Figure 7. Selected point interval with created angle.
CONCLUSION

The present study aimed finite element analysis to determine the stress distribution of bone around the implant mandibular prosthesis to the Plans of dimensional change mandible. In this case, the mandible using models from CT-Scan Data sections 50 mm body was prepared. Implant model 10 * 1.4 mm ITI measured using Outlook 2003 Solid works software was developed by profile Projector. Implants were placed in the jaw in two different designs and three different super structure of the implants were placed. Clench both incisive and muscle strength and clench right first molar, were applied to the muscles and joints. Clench teeth condyle and support were considered. Von Misses stress and minimum stress on the bone around the implants was observed in the super structure Tuesday cut the lowest limits in the jaw, and three pieces of dimensional changes, they operate independently of each other. This article was prepared using a greater number of implants to reconstruct the jaw completely independent of implant protheses to release the dimensional changes of the lower jaw is recommended.

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