

## BIOLOGICAL PHENOMENA WITHIN A PYRAMID MODEL - A PRELIMINARY STUDY ON WOUND HEALING

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**Abstract :** The Great pyramid of Egypt has evoked a keen interest, both for its architectural marvel and mystical significance. Strange things (viz sharpening of razors, longer shelflife of vegetables, altered states of consciousness in humans) are said to occur within a pyramid constructed in the exact geometric proportion to that of Great Pyramid and kept with any of its diagonals aligned north-south along the magnetic axis of the earth. Not much is available in the literature that have subjected "biological phenomenon within a pyramid" to the scientific scrutiny.

This is just a preliminary study with that objective. Wound healing, being a physiological response of the body to injury, the measurement of 'breaking strength' of incisional wound offers an easy, objective method of assessing wound healing.

The study consisted a 'control group' and 'a test group', each of 12 albino rats (Wistar). A paramedian 1" incisional wound was created in both the groups. The controls were kept in the usual rat cages while the 'test group' within a wooden pyramid (18" x 28.25" x 26.9"). The breaking strength of the wound were assessed on the 10th post-wounding day using Kulkarni's modified Lee and Tong method and the results showed a significantly higher value ( $P < .05$ ) for the test group. Further there was histological evidence of better wound healing in the test group.

**Key words :** pyramid model      wound healing      geometric proportion  
North-South magnetic axis      histological evidence  
breaking strength      incisional wound

### INTRODUCTION

The great pyramid of Egypt has evoked a keen interest, both for its architectural marvel and mystical significance. Strange things (viz sharpening of razors, longer shelf-life of vegetables, altered states of consciousness in humans) are said to occur within a pyramid constructed in the exact geometric proportions to that of greater pyramid and kept any of its two diagonal corners aligned north-south along the magnetic axis of the earth. Not much is

available in the literature that have subjected "biological phenomena within a pyramid" to the scientific scrutiny.

**Aim:** To test whether "wound healing" - A physiological response of the body to injury, is better within a pyramid.

### METHODS

**A. Construction of a wooden pyramid:** A wooden pyramid measuring 28.25"(base) x 26.9"(sides)

× 18" (vertical height) was constructed. One of the faces of pyramid acted as a door, being fixed with hinges. The usual grill with feeding bottle was fixed in its interior. Ventilatory holes were provided on all the four faces. Using a mariner's compass, one of the diagonals was aligned north-south magnetic axis (Fig.1).

on the skin of the back was created with strict aseptic precautions. A standardised wound was made possible using geometric compass for marking the points 1" apart. The depth was just adequate to include the entire depth of the skin without injuring the underlying muscle. The wound was sutured with

## MATERIALS AND METHODS

### A. Construction a pyramid

#### WOODEN PYRAMID MODEL

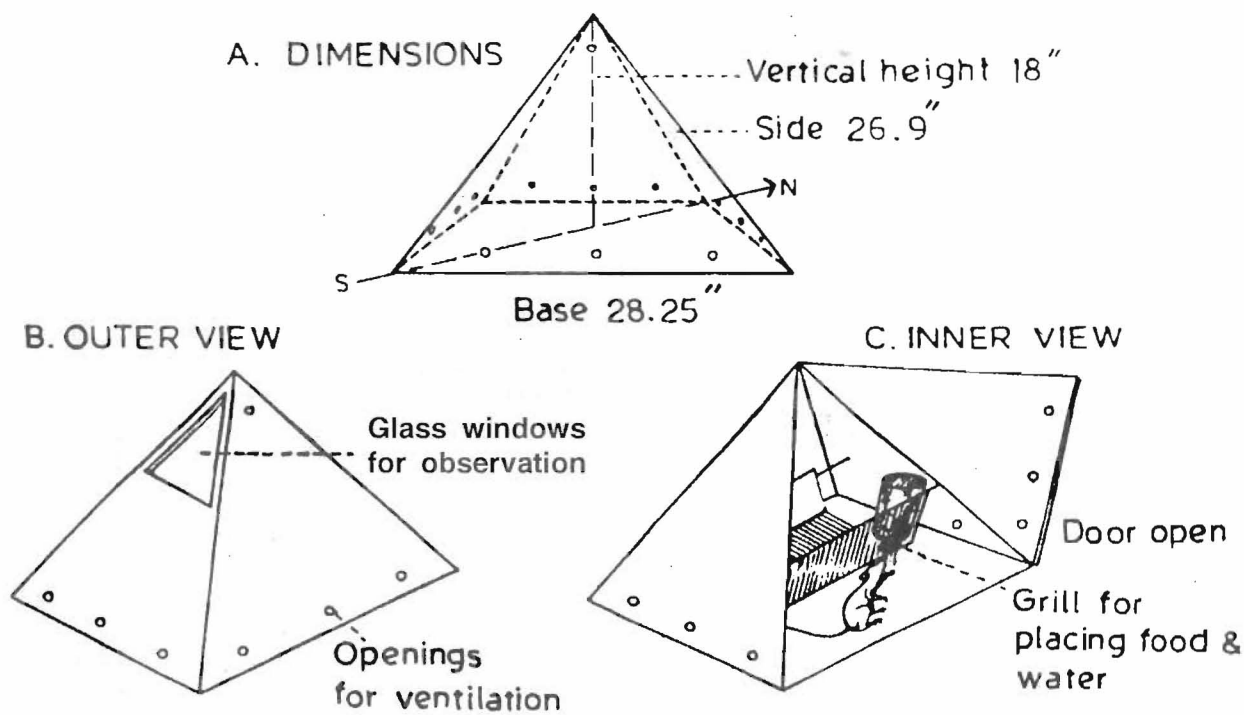


Fig. 1

**B. Creation of an incisional wound:** The study consisted a "control group" and a "test group" each of twelve healthy albino rats (Wistar strain) weighing between 150 gms-200 gms.

Under light ether anesthesia, the skin of the back was shaved. A 1" paramedian incision

intermittent sutures using nylon threads. The procedure was done for both the groups.

The rats which were kept in usual cages acted as "control", and those within the pyramids as "test group". They were given adequate rat feed (M/s Brooke Bond, Lipton India Limited)

and water. The boxes were kept in semi dark rooms at ambient ( $27\pm 3^\circ\text{C}$ ) temperature.

### C. Assessment of the wound healing:

(i) Measurement of breaking strength of the wound healing. It is done by using constant water flow technique as described below.

On 10th post-wounding day, after removing sutures under light ether anesthesia, the animal

rubber tube kept occluded with a pinch cock.

To measure wound-breaking strength, the tube was released to allow a constant and continuous flow of water, from reservoir into the polythene container. As the weight gradually increases, it acts as a pulling force to disrupt the wound. As soon as the gaping of the wound was observed, the rubber tube was clamped and the polythene bottle was weighed using electronic weighing machine.

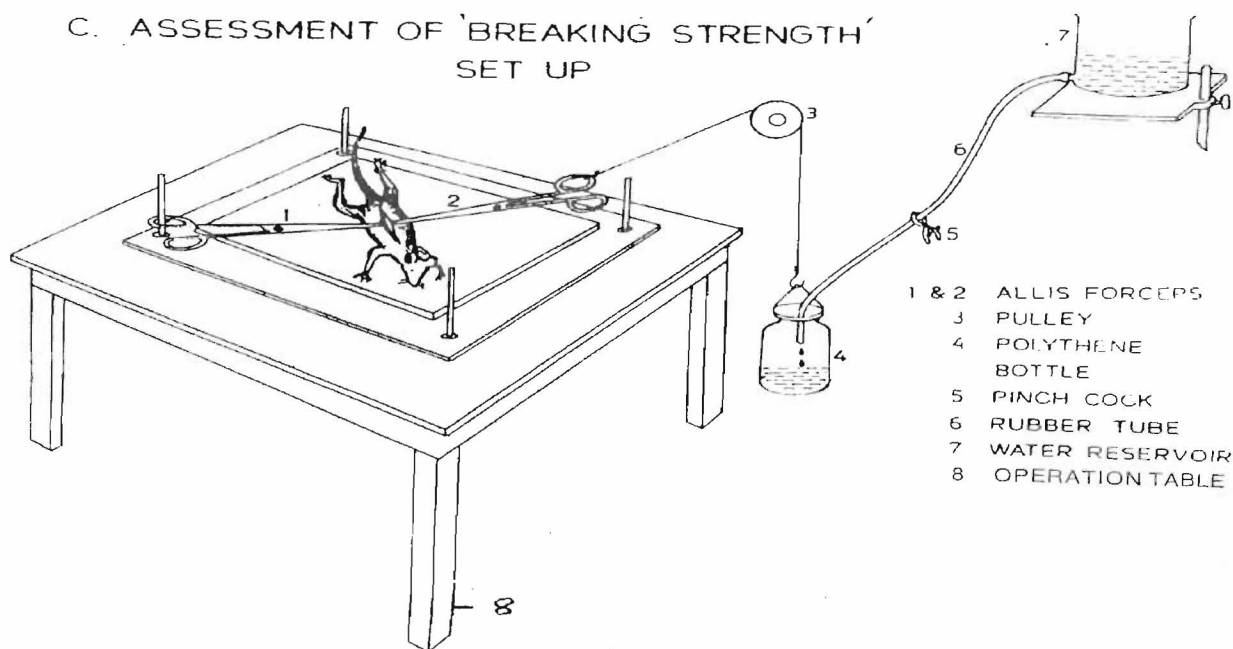


Fig. 2

was secured to the operation table (Fig.2). A line was drawn on normal skin on either side of the wound 3 mm away from the wound line. Two allis forceps were firmly applied on the lines facing each other. On one side the forceps was hooked firmly to metal rod fixed to the operation table. The other forceps was connected to a leak proof graduated polythene container through a string running over a pulley. The polythene container was connected to a large water reservoir placed at a suitable height through a

Four such readings were taken for a given incision wound. The average was taken as the individual value of breaking strength. This was done both for 'control' group as well as 'test group'.

(ii) Histological examination of the wound: After measuring the breaking strength a small portion of the wound along with its floor was excised from both the groups. After fixing in 10% formalin the tissue was subjected to usual histological technique to prepare slices of

10 micron thickness. Staining was done using Haemotoxylin and Eosin. They were observed under microscope using both high power and low power.

(iii) Total leucocyte count and differential leucocyte count. Those were performed using standard procedure on a sample of blood, obtained directly from heart as it is very difficult to obtain sufficient quantity of blood through capillaries.

## RESULTS

1. The breaking strength of the wounds was  $345.75 \pm 103.51$  gms in the 'control' group, but in the 'test group' it was  $478.17 \pm 125.34$  gms. On application of Students' 't' test, the difference was found to be statistically significant ( $P < 0.05$ ).

2. The histological pictures of the wounds after 10 days: The 'test group' showed a healthy and an abundant granulation tissue indicated by the presence of numerous capillaries as well as proliferating fusiform fibroblasts. It was remarkable that there were very few infiltrating mononuclear inflammatory cells. In sharp contrast, the control group showed much less granulation tissue which was infiltrated with lot of mononuclear cells.

3. The total leucocyte count showed a hike from  $7300/\text{mm}^3 \pm 3300$  (on 0 day) to  $14400/\text{mm}^3 \pm 4300$  (on 10th day) in the 'control' group. It was highly significant ( $P 0.001$ ). On the other hand, the test group showed only a small and an insignificant rise from  $9625 \pm 600/\text{mm}^3$  (on 0 day) to  $10150 \pm 500/\text{mm}^3$  (on 10th day).

Table showing changes in differential leucocyte count in control and test group on 1st day and on 10th day respectively.

It appears the lymphocytes form the major percentage of leucocytes in rats normally. In

Control	Cells	% Test		% Control	
		Ist day	10th day	Ist day	10th day
	N	18	06	19	11
	E	05	00	03	02
	B	01	00	01	01
	L	73	92	74	86
	M	03	02	02	00

Note : N = Neutrophils. E = Eosinophils.  
B = basophils. L = Lymphocytes  
M = Monocytes

both the groups the lymphocytes % is raised, which is more in 'controls' than in 'test group'.

## DISCUSSION

Man in general is subjected to a wide range of injuries both accidentally and deliberately inflicted, that may result in the disruption of anatomic or functional continuity of living tissues. Wound healing is a complex process consisting of integrated series of cellular, physiological and biochemical events leading to re-establishment of structural integrity, functional restoration and regain of strength of injured tissue.

Generally, cutaneous wounds have been used as models of investigation of wound healing. Depending upon particular situation, wounds heal by one of the four so called 'intention'. Healing of *clean surgical incisions*, where the edges are opposed by surgical sutures, is said to occur by 'first intention'. Needless to mention, this is the type of sound used for the present study. The development of granulation tissue is considered as a definite sign of normal wound healing process. It consists of new blood vessels that migrate into the wound area and accumulation of fusiform fibroblasts and ground substance within 72 hours. That, these are in plenty, is evident from the photomicrograph of

the 'test group', suggesting a better healing when compared to that of 'control'. The development of wound strength is undoubtedly related to the proliferation of 'fibroblasts' and laying down of collagen. Perhaps this would explain the greater 'breaking strength' of the wounds in the 'test group'.

The invasion of the large number of mononuclear leucocytes of a 10 day old wound as seen in the photomicrograph of the control is on the expected lines. But fewer numbers of leucocytic infiltration in test group is baffling. Considering the role of mononuclear leucocytes in engulfment of foreign materials and removal of damaged cells and debris, it would appear there are less foreign body invasion, damage or debris to remove. Even the physical appearance of the wound was more healthy in the test group. It is possible the 'pyramid' creates 'a special environment', where the chances of wound

getting infected itself is reduced. The fact that the total leucocyte count was significantly increased in 'controls' but not in 'test group' corroborates this view.

## CONCLUSION

Wound healing is better within a pyramid. While there is sufficient histological proof that the space enclosed within a pyramid enhances wound healing, it needs to be explained why the wounds have less tendency to get infected.

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## REFERENCES

- Schull B, Pettit E. In the secret power of pyramids. Ed. First Ballantine Books Edition, A division of Random House, Inc. New York. 1983, p196.
- Brunton PA. A search in secret Egypt. London, Rider 1936.
- Schull B, Pettit E. In the secret power of pyramids. Ed. First Ballantine books edition, a division of Random House, Inc. New York, 1983; 197-198.
- Lee KH, Tong TG. Mechanism of action of retinyl compounds on wound healing II. *J Pharma Sci* 1970;59: 1195-1197.
- Patil PA, Kulkarni DR. Effect of anti-proliferative agents on healing of dead space wounds in rats. *Indian J Med Res* 1984; 79: 445-447.
- Walter and Israil: Text book of general Pathology 1986; 103-115.
- Scilling JA. "Wound healing" *Physiological Reviews*: 1968; 48: 374-423.
- Abot J Nemdth. "Wound healing" *Dermatologic clinics* 1993;11(4):1-2.
- Schwartz Shires, Spencer. Principles of surgery; Mc Graw Hill Inc:Vol 1, 6th Edn. 1994; 297-304.
- Vanlis JM, Kalsback GL. Fibroplasia in wound healing. *Br J Dermatol* 1973; 88: 355-361.
- Ross T. The fibroblast and wound repair. *Biol Rev* 1968; 43: 51.
- Lei Bovich, Ross R. The role of macrophages in wound repair. *Am J Pathol* 1975; 78 (71): 78-101.