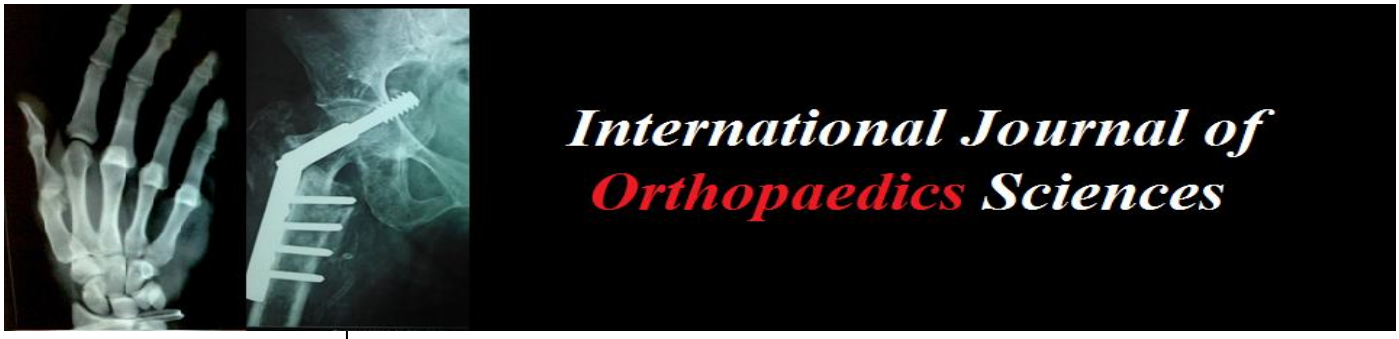

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Results of skin closure using skin staples versus nylon sutures in distal 1/3rd lower limb surgery

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Abstract
Background: This study was conducted to compare the results of skin closure using skin staples versus sutures in distal 1/3rd of lower limb surgery using Southampton Wound Scoring System. This study suggested there was higher incidence of inflammation wound gaping associated with skin staples however it was associated with better surgical scar after removal.
Methods: Out of 60 participants who underwent distal 1/3rd lower limb surgery, in 30 patients wounds were closed with conventional nylon sutures and in other 30 patients wounds were closed with skin staples. Patients were evaluated post-operatively every 3rd day untill the day of suture removal and results were compared on the basis of Southampton wound scoring system, surgical time for closure and in terms of cosmetic appearance of scar.
Results: Out of 60 patients, 34 were males and 26 were females. The Mean age group of this study population was 46.6 years with SD of 12.5 years. Wound infection rate was found to be higher with skin staples (13.33%) as compared to conventional nylon sutures (6.66%). However average surgical time for closure for skin staples was low (2.4 min) as compared to conventional sutures (5.7 min). But skin closure with nylon sutures resulted in a better surgical scar post-operatively.
Conclusion: Primary wound closure in distal 1/3rd of lower limb surgeryis very important to reduce postoperative morbidity and complications. Wound closure with nylon sutures not only results in lesser rates of infection as compared to skin staples but also it gives better cosmetic results post sutures removal. The only advantage of using skin staples bekng less surgical time for wound closure.

Keywords: Hip fracture, bone turnover markers, CTX, PINP, vitamin

Introduction

- In the spectrum of surgical decision-making, wound closure material is often an afterthought. With pressure placed on surgeons to increase efficiency and reduce the length of hospital stay, patients are mobilized quickly postoperatively [1].
- Stress on wounds from early mobilization and accelerated rehabilitation programs highlights the importance of skin closure [2].
- Effective skin closure conducive to wound healing by primary intention is vital for the postoperative morbidity. Skin closure has proved elusive despite unceasing efforts for many millennia not only due to techniques but also because no ideal suture material has so far been found [3].
- From time to time in surgical literature, there have been discussion of the ideal suture material. A wide choice of suture materials is available to surges today. The choice of suture for a particular procedure should be based on the known physical and biological properties of the suture material, suturing technique and the healing properties of the sutured tissues. However, the availability of the suture material and the personal preference of the surgeon play important roles [4].
- The importance of primary skin healing in the distal 1/3rd of lower limb surgery is paramount because of lack of stretchability of skin, comparatively decreased blood supply in that region. General physiological status of patient and also nutrition play a very important role
- Sutures available today are classified as permanent or absorbable, natural or synthetic, and

multifilament or monofilament. Multifilament or braided sutures are easy to handle and have favorable knot-tying qualities. However, bacteria can enter the braided interstices and escape phagocytosis, potentially leading to suture infection, granulomas and sinuses. By contrast, monofilament sutures cause significantly fewer tissue reactions and glide easily through tissue. Their disadvantages include high retention of package shape, difficult handling, knot insecurity, and potentially cutting through tissue [4].

- In orthopedics surgery, the most common skin closure methods are the use of staples or sutures. Yet, there seems to be no consensus in the literature as to which closure method is superior, with some studies reporting no difference and others reporting a higher wound complication rate following the use of staples [5, 6].
- In practice, it is uncommon for a patient to receive the choice of closure method pre-operatively and it is also rare to find patients with absolute preferences to one closure material over another. Hence this study has been undertaken to compare two methods of wound closure (staples, nylon).

Materials and Methods

This study is a prospective study conducted at MGM hospital, Kamothe over a period of 6 months from January 2019 to June 2019.60 Patients undergoing distal 1/3rd lower limb surgery were included in this study.

Total no. of patients

60 Patients operated for Distal 1/3rd Lower Limb surgery which were divided in Group A and Group B by Randomisation method.

Group A patients:

30 patients having wound closed with Nylon sutures

Group B patients:

30 patients having wound closed with Staples

Inclusion criteria

Fracture involving ankle and distal 1/3rd of tibia fibula

Fracture involving foot

Tendon repair surgery eg: Tendoachilies repair.

Age Group: 12-70 years

Gustillo Anderson Type 1, 2, 3A, 3B injuries.

Exclusion criteria

Patients with Comorbidities that will affect wound healing Eg: Diabetes, hypoproetinemia

Gustillo Anderson Type 3C injuries

Period of follow-up

All patients from Group A and Group B will be followed up post operatively every 3rd day to look for the wound condition, South hamton wound score will be calculated and compared for both the groups.

Parameters for evaluation

Southampton Wound Scoring System

Statistical tests

The collected data will be evaluated using appropriate statistical methods.

Results

Age

Mean age of the study population was 46.6 years with a standard deviation of 12.5 years. Mean age among Group A patients was 47.4 years and that among Group B patients was 45.8 years. This difference was found not to be statistically significant (P=0.402). Hence two groups were comparable in terms of age groups.

Gender

Out of total 60 patients, 34 (56.66%) were males and 26 were females (43.33%). Two Study Groups were comparable in terms of gender distribution. (P=O.102).

The distribution of patients is shown table given below.

Table 1: Gender Distribution

	Men	Women	Total
Nylon sutures n=30	18	12	30
Skin Staples N=30	16	14	30

Out of 60 patients, 51 patients had normal wound healing. Out of the other 9 patients about 6 patients were infected and 3 patients were having hemoserous discharge at the time of suture removal. Out of 6 infected patients, 4 patients had undergone skin staples wound closure while in other 2 patients wound was closed with nylon sutures. About 6 patients had signs of erythema and 6 more patients presented with erythema plus other signs of inflammation like local rise of temperature, tenderness but all the signs healed over a period of time. About 4 patients with nylon sutures had developed marginal necrosis of wound but it healed without significant complications. Closure with nylon sutures resulted in a better surgical scar after sutures removal. Howere time for closure of the wound with skin staples was significantly lesser (2.4 min) as compared with conventional sutures (5.7 min).

The Following table shows the distribution of patients according to their Southampton score post-operatively every 3rd day till the day of sutures removal.

Table 2: Southampton wound score

Postoperative Day	Grade 0	Grade I	Grade II	Grade III	Grade IV	Grade V	Total
3rd Day	50	4	2	2	2	0	60
6th Day	45	6	3	2	4	0	60
9th Day	52	0	0	3	5	0	60
12th Day	51	0	0	3	6	0	60
Suture Removal	51	0	0	3	6	0	60

Fig 1: Normal wound healing

Fig 2: Marginal necrosis

Fig 3: Serous discharge from wound

Fig 4: Infected wound

The first picture shows normal healing wound (Southampton grade 0) closed with conventional nylon sutures. 2nd picture shows marginal necrosis of wound closed by nylon sutures on 6th post-operative day which healed over a period of time without any complications. 3rd picture shows wound closed with skin staples with Southampton Grade 3.the final photograph show the infeced wound (Southampton Grade 4) which was earlier closed with skin staples.

Discussion

This limited study has revealed a higher complication rate in wounds closed by staples, compared with those closed by Nylon sutures. Closure with Nylon sutures in distal 1/3rd lower limb surgery can result with marginal necrosis especially if sutures are too tight, but it usually heals without significant complications. The advantage skin staples is its speed of execution and better surgical scar but it is also more expensive as compared to nylon sutures. But at the end, choice of suture depends on surgeons or patients preference, surgical time, availability of suture material.

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