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A COMPARATIVE RESEARCH TO DRAW A CORRELATION BETWEEN PROPELLER AND PEDICLED FLAPS TO COVER TIBIAL WOUNDS

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Abstract:

Objective: *The objective of the research was to correlate the pedicled flap primary success rate (flap survival) against propeller flaps for the treatment of tibial injuries.*

Material and Methods: *This comparative research was carried out at Mayo Hospital, Lahore from February to July 2018 on a total of 60 patients. A total number of enrolled patients for research are sixty having wounds (≤50cm²), merely involving tibial of less than or equal to one-month duration. Both the gender having age fifteen to sixty years were selected for research. Those patients having mal-aligned bones fixation, peripheral vascular, polytrauma and ischemic heart diseases and patients with segmental bone loss were not included in the research.*

Results: *The researcher categorized the patients in two groups. In group "A" & "B", an average was respectively (32.48 ± 10.84) years & (33.56 ± 10.13) years. Among sixty patients, the number of male patients was forty-two (seventy percent) along with eighteen (thirty percent) female patients whereas male to female ratio was 2.3: 1. The average volume of the wound in Cat – A was (24.80 ± 10.33) cm² and in Cat – B was (26.48 ± 12.10) cm², the average wound time period for Cat – A was (11.88 ± 5.27) days and in Cat – B was (12.72 ± 6.02) days. The primary success rate in pedicled flap (Cat – A) was twenty-seven (90 %) and in propeller flap (Cat – B), it was nineteen (63.33%) (P-Value 0.013).*

Conclusion: *The research determined that primary success rate of the pedicled flap; (flap survival up to two months) was much greater with respect to propeller flap in the recovery of tibial injuries and must be practised daily in our routine life to minimize the bitterness of these specific patients.*

Keywords: *Primary Success Rate (PSR), Tibial Wounds, Flap Survival.*

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INTRODUCTION:

The objective of the lower extremity renewal is the recovery of legs open injuries to provide the patient with a cured wound so that his life could be normalized. Exposed injuries and flaws in lower extremity produce peripheral disease, diabetes, tumour resection and trauma; due to diverse causes, these injuries required reconstruction. Initially, any open injury of bone which is not covered by vascularized soft tissues is a huge danger of bone osteomyelitis, sepsis and bone Necrosis [1 – 3]. Because of tissues flaws, bad circulation and deficient and compact local tissues, soft tissues management close to the leg 3rd lower and foot present a substantial challenge to reformative surgeon [4 – 5].

An enduring flap has the excellent texture of the skin, dependable vascularity, sound arc rotation, comfort dissection and less malaise of donor site is very craving choice for the treatment of these flaws.

In daily experiences, there is a different type of pedicled or (muscular flaps) for renewal of soft tissues flaws of the lower limb. These methodologies are not generally used by the orthopaedic surgeon due to insufficient knowledge about these methodologies and issues appeared from the donor locality [1 – 2]. Traditional reformative choices comprise of pedicled muscular flaps, perforator flaps, the transformation of free micro vascular tissues, cross leg and local random fasciocutaneous flaps, split skin grafting and Ponte's super flaps [7].

Transformation of tissues turns into the suitable reformative choice for lower limb after the microsurgery introduction where the parochial flap is not available [8]. Perforator flaps development provides dependable flaps for the reformation of the lower limb [9]. Even though perforator propeller flaps are reliable, useful and uncomplicated, fascinating in shape, after surgery engorgement does not happen and specifically appropriate for treatment of soft tissues of lower legs, as well as foot flaws, however, pedicled perforator flaps have additional superiority over propeller flaps [10]. Moreover, there is no such requirement of specific devices as well as the transformation of patients to particular centres [11]. As very limited literature was available which highlighted the correlation of tibial wound PSR treated by propeller against pedicled flaps so the objective of the research was to correlate pedicled flap PSR (flap survival) against propeller flaps for treatment of tibial injuries. Additionally, the findings of the research were to provide us best methodologies for the treatment of tibial wounds, so that specific methodology can be preferred and used as a normal routine in our clinical practices to achieve better outcomes and minimize patient bitterness.

PATIENTS AND METHODS:

This comparative research was carried out at Mayo Hospital, Lahore from February to July 2018. A total number of enrolled patients for research are sixty having wounds ($\leq 50cm^2$), merely involving tibial of less than or equal to one-month duration. Both the gender having age fifteen to sixty years were selected for research. Those patients having mal-aligned bones fixation, peripheral vascular, polytrauma and ischemic heart diseases and patients with segmental bone loss were not included in the research. The researcher categorized the patients in two categories (A & B). After suitable debridement, treatment of soft tissues was applied by split thickness graft in Cat – A patients whereas with propeller flaps in Cat – B patients. After surgery, an operated leg was lifted up to minimize the oedema and suffering. The researcher performed the two hourly flaps monitoring for initial twenty-four to forty-eight hours for temperature, colour, capillary refill and turgor despite this if still uneventful then patients were released from the hospital after the 7th day of surgery. Entire patients were pursuing after one week of release from hospital and afterword biweekly up till two months and the final results were composed. After the ending of the 2nd month, the researcher recorded the conclusive success rate (flap survival). However, if covering flaps had subsisted entirely deprived of necrosis (wound completely recovered) or dehiscence till two months then flap survival was assumed as yes and no if there was as whole or minor flap necrosis or dehiscence till two months. Entire facts were recorded on Performa made for said objective. SPSS was used for statistical analysis of data and SD as well as average was calculated for time duration and volume of the wound along with age. For PSR and gender, the researcher calculated the percentage as well as frequency moreover for PSR comparison, utilize chi-square test as well. The PSR of the two research categories was compared for dissimilarities. P value ≤ 0.05 was assumed as important. Via stratification along with post-stratification, confounders such as volume and time duration of the wound, age and gender were controlled. The researcher performed a chi-square test to observe the consequences on results (P-Value ≤ 0.05).

RESULTS:

The research population was in the age bracket of 15 – 60 years with an average age of (33.12 ± 10.39) years. The average age for Cat – A patient was (32.48 ± 10.84); whereas, for Cat – B patients it was (33.56

± 10.13) years. An average wound volume was (25.64 ± 11.64) cm². Average wound volume for Cat – A was (24.80 ± 10.33) cm² and for Cat – B was (26.48 ± 12.10) cm². Total average wound time period was (12.30 ± 5.61) days. An average wound time period for Cat – A was (11.88 ± 5.27) days and for Cat – B (12.72 ± 6.02) days. Cat – A PSR in pedicled flap 27 (90%); whereas, for the propeller flap in Cat – B it was 19 (63.33%) (P-Value = 0.013).

Patients of both the categories were further divided into 3 age categories which are fifteen to thirty, thirty-one to forty-five and forty-six to sixty years. The PSR in fifteen to thirty-year age category was recorded in fourteen cases (93.33%) of category "A" and eight cases (61.54%) of category "B". Statistically expressive variation of PSR was recorded between the category "A" and "B" with P value = 0.041. The PSR in thirty-one to forty-five-year age category was recorded in ten patients (90.91%) of category "A" and eight cases (66.67%) of category "B". Statistically unimportant variation of PSR was recorded between the category "A" and "B" with P value = 0.159. The PSR in forty-six to sixty-year age category was recorded in three patients 75.0%) of category "A" and three patients (60.0%) of category "B". Statistically unimportant variation of PSR was recorded between the category "A" and "B" with P value = 0.635.

PSR was recorded in Twenty (90.91%) and thirteen (65.0%) male cases of category "A" & "B" respectively. Differences of PSR in male cases off both the research categories were statistically important with the value of P = 0.041. PSR was recorded in seven (87.50%) and six (60%) female cases of category "A" & "B" respectively. Differences of PSR in female cases off both the research categories were statistically unimportant with the value of P = 0.196.

Researcher distributes the patients with respect to the volume of the wound and made two categories i.e. wound volume ≤ 25cm² & wound volume > 25cm² to ≤50cm². Those patients having wound area ≤ 25cm², PSR was recorded in seventeen (89.47%) and fourteen (73.33%) cases of category "A" & "B" respectively, however, the variations were statistically unimportant with P value = 0.335. Those patients having wound area > 25cm² to ≤50cm², PSR was recorded in ten (90.91%) and five (41.67%) cases of category "A" & "B" respectively however the variations were statistically important with P value = 0.013.

Patients were further distributed in two categories with respect to wound span i.e. less than fifteen days category & greater than fifteen to less than or equal to thirty days category. PSR was recorded in those patients having wound duration less than fifteen days was nineteen (95%) and eighteen (81.82%) cases in category "A" & "B" respectively however the recorded PSR variations were statistically unimportant between both the categories with P value = 0.124. PSR was recorded in those patients having wound duration greater than fifteen to less than or equal to thirty days was eight (80.0%) and one (12.50%) case in category "A" & "B" respectively and recorded PSR variations were statistically important between both the categories with P value = 0.036.

Table – I: Group Wise Primary Success Rate

Primary Success Rate	Yes		No		P-Value
	Number	Percentage	Number	Percentage	
Group – A	27	90	3	10	0.015
Group – B	19	63.33	11	36.67	

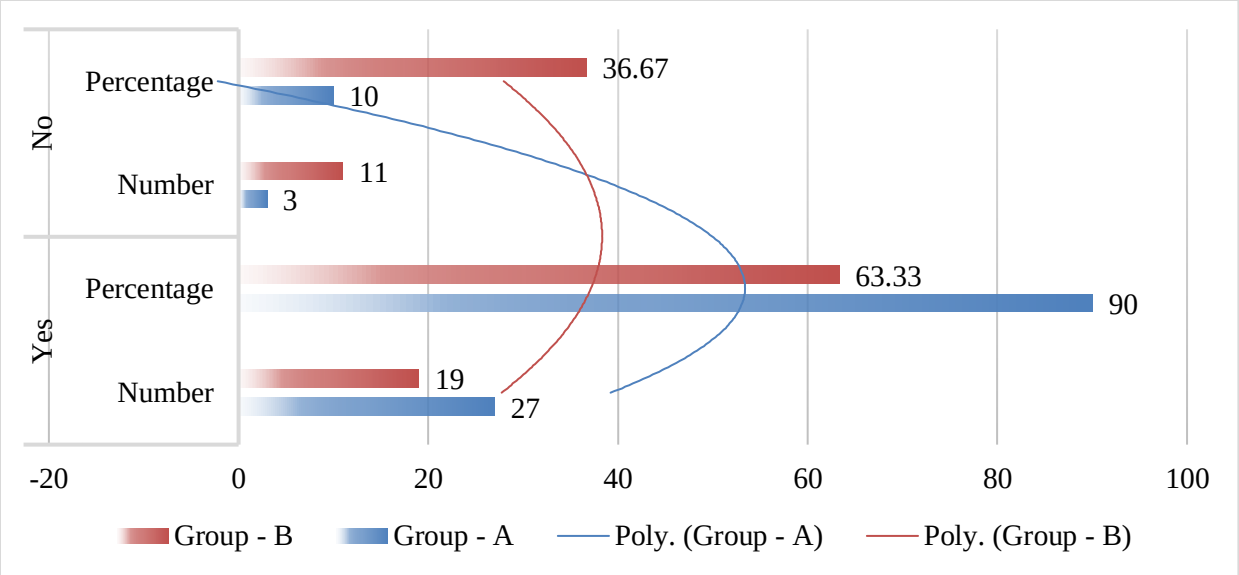


Table – II: Age and Gender Wise PSR

Primary Success Rate		Group - A		Group - B	
		Yes	No	Yes	No
Age (Years)	15 - 30	14	1	8	5
	31 - 45	10	1	8	4
	46 - 60	3	1	3	2
Gender	Male	20	2	13	7
	Female	7	1	6	4

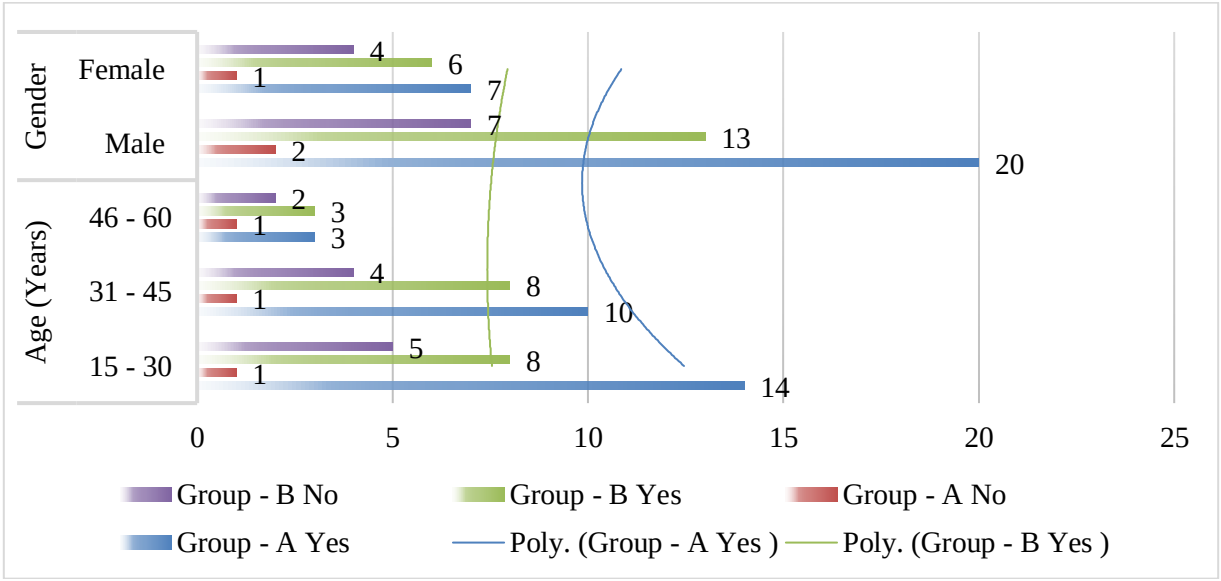
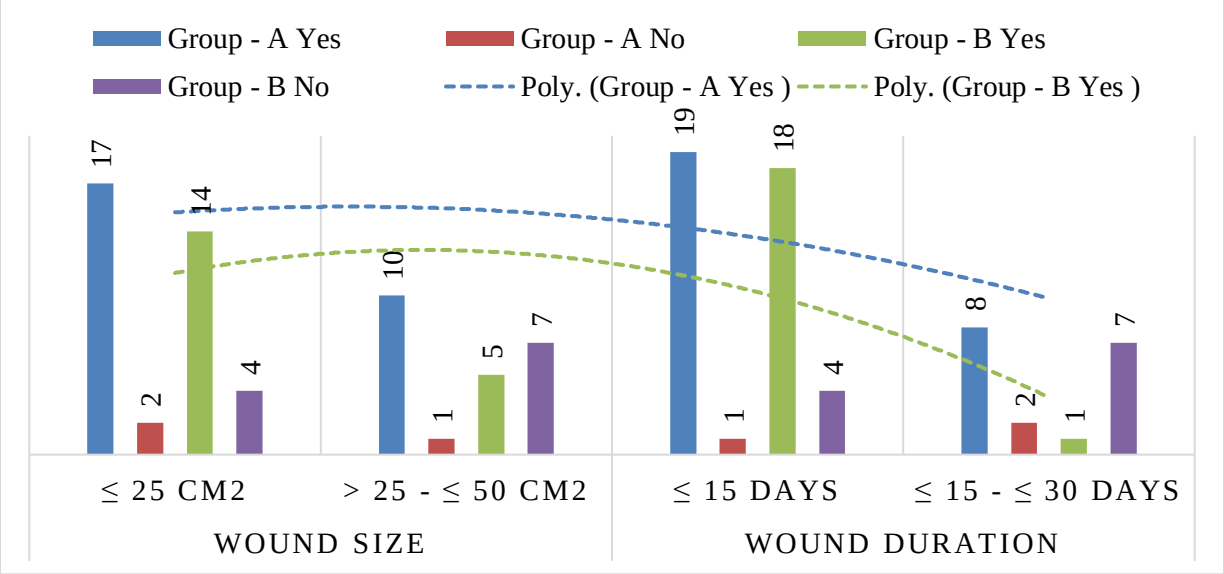


Table – III: Wound Duration and Size Wise PSR

Primary Success Rate		Group – A		Group – B	
		Yes	No	Yes	No
Wound Size	≤ 25 cm^2	17	2	14	4
	> 25 - ≤ 50 cm^2	10	1	5	7
Wound Duration	≤ 15 Days	19	1	18	4
	≤ 15 - ≤ 30 Days	8	2	1	7



DISCUSSION:

Local fasciocutaneous flaps, split-thickness skin graft, direct structuring and local muscle flaps are multiple procedures used for the cessation of open tibial injuries so we conducted the research to correlate pedicled flap primary success rate (flap survival) against propeller flaps for treatment of tibial injuries.

In our research PSR (covering flaps) had completely recovered without any necrosis (injury having absolute recovery, discoloured as well as very foul odour soft tissues) or dehiscence (fissure of wounds on operative location within two months duration) of pedicled flap category (category "A") was twenty-seven whereas in propeller flap category (category "B") it was nineteen (63.33%) in soft tissues recovery of remote tibial injuries. Tintle SM et al presented PSR of the pedicled flap as (97.0%) in his research, whereas Georgescu et al has presented PSR of propeller flap with reference to flap survival as (72.0%) in his research [12, 13]. In a research performed by Zayakova YK et al on eleven pedicled flap patients, the prosperous outcome was noticed in ten cases [14]. In a review of fifty Meta articles, recorded PSR of survival flap as (82.0%) [15]. uniformly in a sural flap retrospective review, the PSR of entanglements was (59.0%) (41/70 flaps), minor as well as total necrosis in (17%) & (19%) flaps [16].

In one additional research presented by Akhtar S et al recorded flap survival rate (78.50%) patients, minor as well as total necrosis in (16.5% & 9.5%) patients [17]. Distal based pedicled flaps were used by Ashfaq F et al in his research to recover ankle and foot necrosis in 5 patients and complete complexity rate of (60.0%) was noticed [18]. There was 1(20.0%) complete flap detriments and 2 (40.0%) minor flaps defects. Entanglement rate is uniform to Baumeister, SP et al who disparately reviewed entanglements of the sural flap in seventy successive patients and detected (59.0%) entanglement rate with (19.0% & 17.0%) of complete and minor flap necrosis [19]. One research conducted in Rawalpindi Pakistan has correlated sural flap against plantar artery flap for recovery of heal necrosis and detected sural flap much batter in term of minor entanglements,

primitive mobilization and weight bearing [20]. So that the research concluded that primary success rate of the pedicled flap; (flap survival up to two months) was much greater with respect to propeller flap in the recovery of tibial injuries and must be practised daily in our routine life to minimize the bitterness of these specific patients.

CONCLUSION:

The research determined that primary success rate of the pedicled flap; (flap survival up to two months) was much greater with respect to propeller flap in the recovery of tibial injuries and must be practised daily in our routine life to minimize the bitterness of these specific patients.

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