

# Efficacy of systemic functional rehabilitation combined with anticoagulant therapy in the preoperative period of ankle fractures

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## Abstract

**Background:** The lower leg joint is a pivot type talocrural or synovial joint situated at the crossroads of the tibia, fibula (leg bones), and bone (foot bone). When the lower appendage of a foot, suddenly, rolls or curves, a lower leg sprain occurs; which might even indicate lower leg joint fractures.

**Objective:** To contemplate the therapeutic impacts of foundational, practical recovery combined with anticoagulant treatment in the post-operative time of lower leg fractures.

**Materials and Methods:** A total of 231 patients with lower leg fractures who were previously treated in the clinic's muscular office from January 2017 to June 2019 were divided into the benchmark group and the exploratory gathering. The benchmark (control) group received regular restoration treatment, while the experimental group received foundational, practical recovery combined with anticoagulant medication.

**Results:** Univariate investigation showed no significant difference for the clinical information like age and sex between the two groups ( $p > 0.05$ ). The Wilcoxon rank whole test indicated that the trial group had a preferable treatment impact over the benchmark group ( $p < 0.05$ ). The endurance bend additionally uncovered that the frequency of postoperative unfavorable inconveniences in the trial group was lower than that in the benchmark group ( $p = 0.047$ ). Fourteen days after the medical procedure, the serum factor levels (D-dimer content, fibrinogen) in the exploratory group were lower than those in the benchmark group ( $p < 0.05$ ), and the consequences of vascular shading Doppler ultrasound indicated that the occurrence of profound vein apoplexy in the trial group was lower than that in the benchmark group ( $p < 0.05$ ).

**Conclusion:** Fundamental utilitarian restoration combined with anticoagulation treatment can improve the postoperative recovery impact of lower leg patients, decrease careful entanglements, and the event of profound vein apoplexy of the lower appendages. [*Ethiop. J. Health Dev.* 2021; 35(4): 355-361]

**Keywords:** Ankle fracture; Anticoagulation therapy; Rehabilitation; Deep vein thrombosis

## Introduction

The lower leg joint is a significant joint in the human body with a robust design to keep up strolling capacity. Circuitous impacts can prompt severe lower leg sprain and lead to fractures (1-3). The clinical signs of lower leg fractures are swelling, which is accompanied by extreme pain, which is treated through the use of careful decrease and obsession and postoperative recovery practices in order to decrease the discomfort and to reestablish typical joint capacity (4-6). At present, the postoperative restoration treatments fundamentally embrace the techniques for non-weight-bearing dynamic exercises and inactive instrument practice preparation. However, patients experience the ill effects of restricted joint development, severe pain, and swelling, influencing the restoration treatment impact. A few investigations into these treatments, identified with the arrangement of venous apoplexy in lower appendages and recuperation of collective capacity (7-11). With the advancement of restoration treatment innovations, methodical, reasonable recovery practices guided by proficient recovery specialists have been demonstrated to effectively affect the postoperative recovery of an assortment of fractures (11,12). Therefore this research, investigated the adequacy of practical foundational recovery combined with anticoagulant treatment in the peri-operative time of lower leg fractures, on this premise, the patients were treated with rivaroxaban for anticoagulant therapy, to see whether fundamental capacity recovery

combined with anticoagulant treatment could improve the treatment impact of lower leg joints, in a medical procedure and decrease the occurrence of profound venous apoplexy in lower appendages.

## Materials and Methods

**General clinical information:** A total of 231 patients undergoing lower leg joint medical procedures in the department of muscular health of the emergency clinic from January 2017 to June 2019 were chosen, which included 124 males, with a mean age of  $43.87 \pm 8.53$  years. Inclusion criteria: (1) patients with lower leg fractures affirmed by X-beam film and ready to undergo careful treatment; (2) sound mental health; (3) with complete clinical data; (4) one-sided shut lower leg fracture. Exclusion criteria: (1) disturbed mental states; (2) open fractures; (3) Pathologic crack brought about by osteoporosis; (4) with tumor, diabetes, and other serious illnesses. The morals board endorsed this investigation, and every one of the patients and their families signed the consent form.

## Treatment

A total of 231 patients with lower leg fractures conceded to the emergency clinic from December 2017 to June 2019 and were chosen as the participants of this study. After receiving consent, all of the patients went through X-beams and CT imaging assessments. As per the patient's condition, senior specialists conducted open decrease and interior obsession medical

procedures for the patient at a chosen time. During the medical procedure, the hematoma, bone part, and unusual implanted delicate tissue created through the fracture were repaired. Plates and screws were utilized for the inward obsession of the uprooted bone. The patients were divided into the benchmark group and the trial group according to their preference. The benchmark group received standard recovery treatments following the medical procedure, and the trial group received efficient, beneficial restoration combined with anticoagulation therapy following the medical practice.

The AO and Lauge-Hansen classification systems are widely used for the clinical diagnosis of ankle injuries. The AO classification system emphasizes the coordinating role of fibula and syndesmosis of the ankle joint. The Lauge-Hansen classification system emphasizes different stages of pathological damages to the ankle ligament system. Nonsurgical treatments are available in the case of trimalleolar or bimalleolar fractures. These types of treatments are considered in the case of patients with significant health problems. Patients may recover within six weeks.

The benchmark group received standard recovery treatment. Following a month and a half of mortar obsession, as per the patient's lower leg recovery, the influenced region should be delicately kneaded to dispense of the hematoma. Simultaneously, with the assistance of the relatives, lower leg detached development, dynamic development, and suitable weight preparation were directed bit by bit. During this period, patients were monitored closely for recovery and possible indications of further injury.

The exploratory group embraced deliberate joint recovery combined with anticoagulant treatment. The influenced appendage was raised at a 30-degree point with the appendage 2-3 days after the activity to elevate the blood stream to the influenced appendage and to decrease hematoma. Simultaneously, the patient was told to flex and expand the metatarsophalangeal joint and interphalangeal joint as gradually as possible. Yet, the lower leg was kept away during the interaction. Seven days after the activity, the patient was told to effectively move the toes as gradually as possible, following the guidelines of progressive preparing from immobilized to mobile. Following three and a half months, the patient is urged to flex and broaden the lower leg joint effectively and use recovery gear or continuously increment the scope of movement of the lower leg joint with the assistance of relatives while additionally moving the knee joint to prevent muscle atrophy. Between 2-6 months after the activity, the lower leg joint weight preparation was done simultaneously, while additionally expanding the action force of the lower leg joint, and the preparation power was changed relying upon the patient's resilience degree during exercise. Based on this restoration treatment, the patients in this group took 10 mg rivaroxaban (supported by the public medication J20180077, Bayer) every day for anticoagulant therapy from 24 hours after medical procedure to about fourteen days after the medical procedure.

### **Perception pointers and judgment of treatment impact**

**Event of profound vein apoplexy of lower appendages and recognition of related serum factors:** Two patients were analyzed through the use of a shading Doppler ultrasound (GE730, general in the US) of respective lower appendage veins one day prior and fourteen days after medical procedures to decide the presence of profound venous apoplexy of the lower appendage. Doppler ultrasound is a noninvasive test employed to estimate the blood flow through an individual's blood vessels by bouncing high-frequency sound waves off circulating red blood vessels. It may help diagnose many conditions, including blood clots, a blocked artery, heart valve defects, bulging arteries, etc. Venous apoplexy in the popliteal vein or its proximal end was recorded as proximal blood clots of the lower appendage. Venous clots at the distal popliteal vein were registered as distal clots of the lower furthest point. In the meantime, venous blood was gathered from the patients one day before the activity, a few weeks after the workout, and fourteen days after the movement. The d-dimer content in the blood was identified by latex agglutination-immuno-dissipating turbidimetry. The fibrinogen content in the blood was distinguished by the ELISA unit (EY3731, Shanghai, China).

**Assessment of restoration treatment impact:** The Mazur scoring rules for lower leg work were utilized to assess the patients' lower leg work 100 days after the medical procedure, categorized as fantastic (> 92 focuses), great (87-92 focuses), reasonable (65-86 focuses), and poor (< 65 focuses) (13). Postoperative confusions were recorded, including cut disease, horrendous joint inflammation, osteomyelitis, and joint solidness. Simultaneously, the disappointment pace of inward obsession was recorded. The judgment measures were as follows: parallel malleolus retrograde dislodging, back malleolus proximal uprooting > 5mm methods, and disappointment of interior obsession.

### **Postoperative development**

Patients were followed for 100 days after the medical procedure. Endpoint occasions were characterized as unfriendly results during the subsequent period. Disagreeable effects included: the patient cut contamination, awful joint inflammation, osteomyelitis, joint firmness, and careful failure. Deletion was characterized as loss of follow-up and withdrawal after release.

**Factual examination:** The reception pace of counter-information is communicated as (%). The estimation information adjusting to the ordinary dissemination was expressed as mean  $\pm$  standard deviation. The t-test and chi-square trial of two autonomous examples were utilized to compare the two gatherings in everyday clinical information, apoplexy occurrence, and different markers. Simultaneously, the Wilcoxon rank entirety test was used to examine the recuperation impact of various treatment techniques on lower leg joint capacity. Furthermore, Kaplan-Meier endurance bend was drawn, and the distinction in the short forecast between the two groups was dissected using a

log-rank test. SPSS 20.0 was utilized for the above factual examinations, and  $P < 0.05$  was considered measurably significant.

**Results**

**Correlations of general clinical information between the two groups:** The general clinical information of the

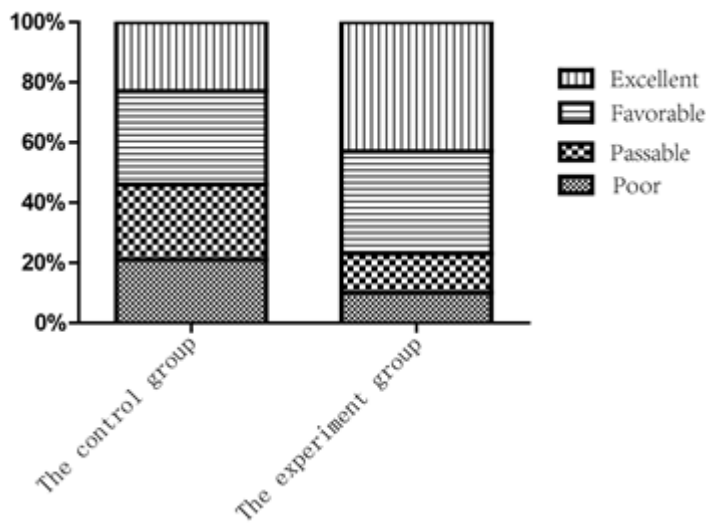
two groups appears in table 1. The t-test and chi-square investigation consequences showed no factual distinction in the available clinical knowledge of the two gatherings, like age, sexual orientation, BMI, and diabetes history ( $P < 0.05$ ).

**Table 1. Examination of general clinical information between the two gatherings**

	Control group (n=86)	Experimental group (n=145)	Test statistics	p value
Age	42.89±8.75	45.19±9.03	-1.893	0.06
Sex	50 (58.14%)	81(55.86%)	0.114	0.736
BMI	24.51±2.75	23.19±4.07	1.542	0.124
Smoking history	28(32.56%)	49(33.79%)	0.037	0.847
History of diabetes	23(26.74%)	36(24.82%)	0.266	0.606
Cause of injury				
traffic accident	24(27.90%)	41(28.27%)		
Work accidents	37(43.02%)	62(42.76)	0.004	0.998
Slip and fall	25(29.08%)	42(28.97%)		
Weber parting				
A	35(40.70%)	60(41.38%)		
B	24(27.91%)	45(31.03%)	0.514	0.916
C	27(31.40%)	40(27.59%)		
Open injury	13(15.12%)	24(16.55%)		
Time from injury to operation (h)	74.52±19.25	75.08±17.37	-0.227	0.82
Operation time (h)	3.64±1.85	3.50±1.54	0.618	0.537

**Correlations of postoperative treatment impact and difficulties between the two groups:** The aftereffects of the Wilcoxon rank test indicated that the treatment impact of the exploratory group was superior to that of the benchmark group ( $P < 0.05$ ). Compared with endurance bends of the two groups, patients differ in terms of the postoperative inconveniences. During the postoperative recuperation period, in the benchmark group, the number of instances of Cut disease,

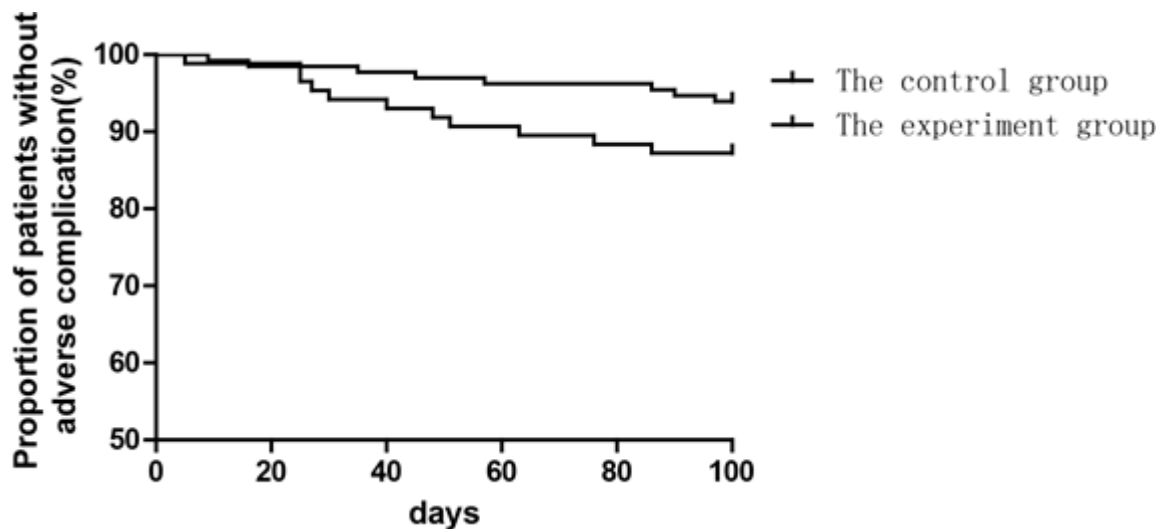
horrendous joint pain, skin putrefaction, osteomyelitis, and careful disappointment was 4, 3, 4, 3, and 1, respectively. The number of instances of Entry point contamination, awful joint pain, skin corruption, osteomyelitis, and careful disappointment in the test bunch was 2, 1, 1, 1, and 2, respectively. The consequences of the log-rank test indicated that the frequency of helpless forecast in the trial group was lower than that in the benchmark group ( $P=0.045$ ).



**Figure. 1** Collection of therapeutic impacts

**Table 2. Correlation of difficulties between the two gatherings**

Group	Incision infection	traumatic arthritis	skin necrosis	osteomyelitis	surgical failure
Control group (n=86)	4	3	4	3	4
Experimental group (n=145)	2	1	1	1	2



**Figure 2. Correlation of surgical complications between the two groups**

**Examination of blood clot event and related serum CRP and d-dimer levels between the two gatherings:** The frequency of apoplexy in the two groups is presented in table 3. The chi-square investigation results indicate that the frequency of lower appendage apoplexy in the exploratory group was lower than that in the benchmark group ( $P < 0.05$ ). The serum levels of

fibrinogen and d-dimer in the two groups appeared in table 4. T-test outcomes indicated no distinction in the degrees of fibrinogen and d-dimer between the two groups prior to the activity ( $P > 0.05$ ). The serum factor levels of the test groups were lower than those of the benchmark group 1 and fourteen days after the activity.

**Table 3. correlation of the occurrence of the proximal blood clot and distal clots between the two gatherings**

Group	Proximal thrombus	distal thrombus	overall incidence	test statistics	P
Control Group (n=86)	2	2	4.65%	4.803	0.042
Experimental Group (n=145)	1	0	0.68%		

**Table 4. comparison of-dimer levels and serum fibrinogen**

Group	Before 1d	After 1W	After 2w
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D-Dimer (ug/L)	Control group	436.84±43.95	516.63±23.64*	461.92±37.52* <sup>&amp;</sup>
	Experimental group	423.74±50.76	463.53±37.84* <sup>#</sup>	413.42±42.07* <sup>#&amp;</sup>
fibrinogen (g/L)	Control group	2.40±0.24	3.31.10±0.23*	2.93.10±0.21* <sup>&amp;</sup>
	Experimental group	2.57±0.19	3.17±0.17* <sup>#</sup>	2.87±0.30* <sup>#&amp;</sup>

### Discussion

The lower leg joint is the central joint which bears the weight when the human body strolls. Its anatomical construction is unpredictable, so it takes an extended effort to mend the fracture. The conventional proportions of postoperative restoration treatment have certain limits, which influence the remedial impact of patients. Simultaneously, the age of profound vein apoplexy brought about by long haul bed rest will likewise cause bone tissue fixations at the fracture site and even reasonable pneumonic embolism to imperil the existence of patients (14-17). Therefore, this investigation reviewed the techniques for methodical utilitarian recovery combined with anticoagulant treatment and found that it can significantly improve the postoperative restoration impact of lower leg joint patients and diminish the rate of profound vein apoplexy, so it has clinical benefits.

#### *The Impact of deliberate restoration practices on functional recovery after lower leg fractures a medical procedure:*

Patients with lower leg fractures are in danger of hindered joint capacity after the medical procedure, so ideal and significant postoperative restoration practice is of incredible importance for postoperative patient recovery with lower leg fractures (11,12). Traditional recovery therapy estimates start late and have a particular visual deficiency, so the level of significance for patients is restricted (18). To guarantee the healing of joint capacity after the medical procedure, this research focused on postoperative recovery practices for patients three days after the medical procedure. Ensuring no further injuries were caused, the patient's toes and joints were exercised on the standard of the relationship of action and dormancy bit by bit. Wilcoxon rank-total test outcomes indicated that patients who underwent deliberate restoration practices would do well in postoperative joint recuperation, and the consequences of endurance bend likewise indicated that the occurrence of postoperative diseases, awful joint inflammation, careful disappointment, and other unfriendly inconveniences in such patients was lower than those in the customary recovery group. Past examinations on the recovery of patients with lower leg fractures have further indicated that early postoperative restoration practices dependent on expected Chinese medication hypothesis or present-day orderly restoration exercises, can improve the careful impact of patients (19,20). This is because regulating recovery exercises can prevent tissue attachment during the time spent recuperating, bringing about practical debasement. It is also essential to focus on the recovery exercise to guarantee the obsession of the fracture site because over-the-top exercise will prompt fracture site removal or expanding wonder.

#### *Worth of postoperative anticoagulation in forestalling lower appendage profound vein apoplexy in patients*

*with lower leg cracks:* Postoperative outcomes are widespread. Minor complications can be easily minimized with medications and repeated outpatient controls. Reoperation is occasionally required to treat significant complications. Revision surgery is mandatory to ensure pain relief and function improvement. For the most part, patients with lower leg fractures need to remain in bed for quite a while following a medical procedure, which causes the patient's bloodstream speed to decrease. Simultaneously, injury from fractures and medical procedures can advance platelet amounts and bond to frame clusters. The arrangement of clots can influence the bloodstream in the veins of lower appendages, prompting tissue growth at the fracture site and prompt the event of contamination. In genuine cases, it might provoke pneumonic embolism and cause the passing of patients (21). In 2010, the public foundation of wellbeing and clinical greatness of the Assembled Realm suggested anticoagulant treatment for all fracture patients with fixed mortar (22), while HAMILTON et al. accepted that patients with lower leg fractures had a low frequency of postoperative DVT and did not require anticoagulant treatment (23). In this investigation, the frequency of profound vein in the lower furthest point of patients without anticoagulation treatment was 4.65%, marginally higher than that of SOOHOO and SOLIS et al. (the frequency of profound vein apoplexy was 4.5% and 0.35%, individually), which might be the aftereffects of ethnic contrasts (24,25). Furthermore, this investigation discovered that the occurrence of a blood clot in patients undergoing anticoagulant treatment was essentially diminished, indicating that anticoagulant therapy could benefit patients. However, consideration should be given to refrain from encouraging activity a day after injury. D-dimer is one of the cross-connected fiber corruption items. Its rise indicates that the fibrinolytic arrangement of the blood is in a hyperactive state, which emphasises the danger of blood clots (26). Fibrinogen is a significant protein associated with thickening, and its increased level is considered a danger for thrombotic infections (27-29). A few weeks after the medical procedure, d-dimer and fibrinogen were brought up in the two groups, indicating that the patients were at risk of apoplexy because of injury, long haul immobilization, and so forth. Nonetheless, these two pointers were lower in patients who received anticoagulant treatment than in the individuals who did not receive anticoagulant therapy during the same period, which further proposed that fitting anticoagulant therapy during the postoperative period could forestall the event of profound venous apoplexy in lower appendages. Some factors, such as, old age, are perceived as high risk factors for profound vein

apoplexy in the lower furthest points after a medical procedure, directed anticoagulation therapy for such patients with high danger components would be significant benefit (30).

### Conclusion

In synopsis, the mix of foundational utilitarian restoration and anticoagulation treatment can improve the postoperative recuperation impact of lower leg joint patients and diminish the rate of careful entanglements and profound venous apoplexy in lower appendages.

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