



## A STUDY ON IMPACT OF *Cissus quadrangularis* ON ACCELERATING FRACTURE HEALING

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### ABSTRACT

**BACKGROUND INFORMATION:** Fractures are one among the medical conditions which can be healed fastly with the help of plant extracts like *Cissus quadrangularis* (a perennial climber) and it might not be a necessary ailment required for fracture healing but many studies have concluded the possibility of fastening the healing process. Animal and human examinations have discovered that *Cissus quadrangularis* may help decrease bone misfortune, speed the recuperating of fractures, and help prevent conditions like osteoporosis. *Cissus quadrangularis* has drawn much attention now-a-days for its medicinal uses because of its efficacy and safety for human use. It does not produce any toxic effects when used orally and due to its various inherent pharmacognostic properties, *Cissus quadrangularis* is prescribed as a beneficial medication to help in fracture healing. By conducting this study we aimed to evaluate the effect of *Cissus quadrangularis* in the fracture healing and assessing the average time to fracture union in different age groups and gender. **METHODS:** A Prospective Comparative study was conducted from November 2019 to April 2020 at Malla Reddy Hospital. 100 patients were admitted and visited orthopedic department for fracture treatment. All the necessary and relevant data were collected from the patient case notes, treatment charts, and laboratory reports. These data were recorded in a specially designed patient proforma. Cases were assigned based on treatment prescribed with *Cissus quadrangularis* (group A) and without *Cissus quadrangularis* (group B) and follow up was done. **RESULTS:** In group A, 2 capsules of 500 mg of *C. quadrangularis* capsule were administered and not administered in group B. It was observed that 34% of patients in group A and 8% of patients in group B has recovered from fracture within the 6 weeks. 78% of the patients in group A and 40% of the patients in group B has recovered from fracture within the 12 weeks where as 94% of the patients in group A and 88 % of the patients in group B has recovered from fracture within the 16 weeks. **CONCLUSION:** The study concluded that *Cissus quadrangularis* helps in reducing pain, swelling, and fracture mobility and accelerate the healing of fracture bones. The duration of treatment is less and they showed better response when compared to other treatment options.

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## INTRODUCTION

The Fractures are one among the medical conditions which can be healed faster with the help of plant extracts like *Cissus quadrangularis*. It is a perennial climber used to hasten the process of fracture healing. Research is being conducted widely all over the globe to assess the therapeutic actions of *Cissus quadrangularis* and is widely used as an osteogenic agent.[1] Bone fracture is a medical condition where the continuity of the bone is broken. A fracture is a wrecked bone. It can run from a slim split to a total break. Bone can crack transversely, longwise, in a few spots, or into numerous pieces. Most breaks happen when a bone is affected by more power or weight than it can bolster.[2]

Nutrition supply is important for bone healing. Calcium is one of the substances, which helps in healing of the bone, but only increased intake of calcium does not improve the rate of new bone formation. studies have shown that the ability for absorption and utilization of calcium should be increased to hasten the healing process. It acts by the stimulation of metabolism and increased uptake of the calcium by the osteoblasts in fracture healing. It also contains vitamin A and C that is effective in the formation of collagen. It also causes an increase in alkaline phosphate level during bone healing.[3]

Differentiation of osteoblasts additionally happens in the dynamic range because of an expansion in alkaline phosphatase (ALP) emission at 1-10µg/mL or the water extract(53-105% increment in mRNA) or 100-300µg/mL of the oil ether extract nearby an expansion in the mRNA of RunX2 (66-118%) just as its transcriptional movement with the water extract; the expansion in ALP action appears to be expected to MAPK enactment, for the most part p38. And both mineral nodule formation and mineralization have been noted to be increased by *Cissus quadrangularis*. [4]

It increases the rate of bone regeneration and improves blood circulation and nutrient supply to the bone. It preserves bone tissue anabolism, regeneration and promotes osteoblastic proliferation and differentiation.[5]

Hence it is widely used because of its various pharmacological properties in humans with its proven efficacy and safety. it also have various actions like antioxidant, antiulcer, anti inflammatory etc.[6]

## AIM:

The aim of this study was therefore (i)to evaluate the impact of *Cissus quadrangularis* in accelerating fracture healing. (ii)to assess the average time to fracture union in different age groups and gender.

## METHODOLOGY :

The present study was conducted at the In-patient and Out-patient Department of orthopaedic ward in Malla Reddy Hospital .Hundred patients were visited and admitted for fracture treatment between 01 November 2019 and 30 April 2020. The patients selected were between 18 –60 years of age. The informed consent was taken from the patient after explaining regarding the study and confidentiality of the data was assured to them. All the necessary and relevant data were collected from the patient case notes, treatment charts, and laboratory reports. The patients were divided into two groups, a test group and a control group. Fifty patients were included in the test group for whom 2 capsules of 500 mg of *C. quadrangularis* capsule were administered. The control group consisted of fifty patients, in whom no supplemental drugs were administered. These data were recorded in a specially designed patient proforma. Patients were discharged when pain reduced and fracture healing when they were able to look after their personal needs.

## STATISTICS:

Results are presented by laying comparisons between groups. The statistical analysis of the data was done using Bar graph and percentages.

## RESULTS:

### Distribution of study subjects according age group:

In this study out of total (n=100),maximum number of patients were in the age group of 50-60 years(33%) followed by age group of 41-50 years(30%), 31-40years(20%), 21-30years(12%), 18-20years(6%).

**Table.1.**

AGE GROUP	TOTAL NO. OF SUBJECTS
18-20	6 (6%)
21-30	12 (12%)
31-40	20 (20%)
41-50	29 (29%)
51-60	33 (33%)

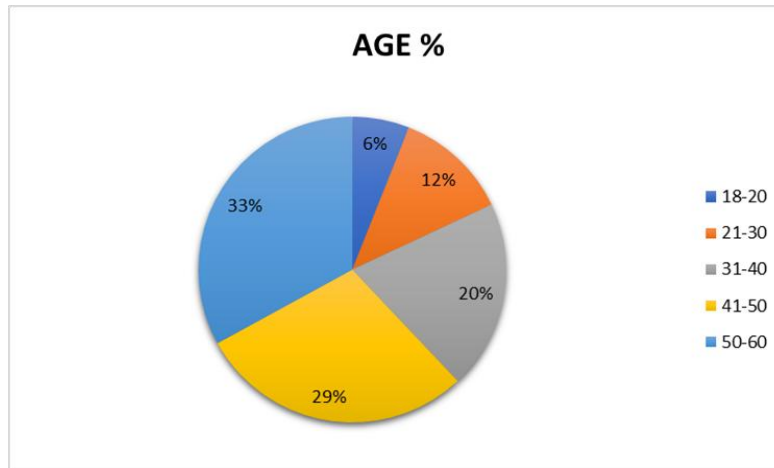


Fig.1.

**Distribution of study subjects according gender:**

In this study out of total (n=100), maximum number of patients was found to be females (58%) when compared to males (42%).

Table. 2.

GENDER	NO. OF SUBJECTS
MALE	42
FEMALE	58

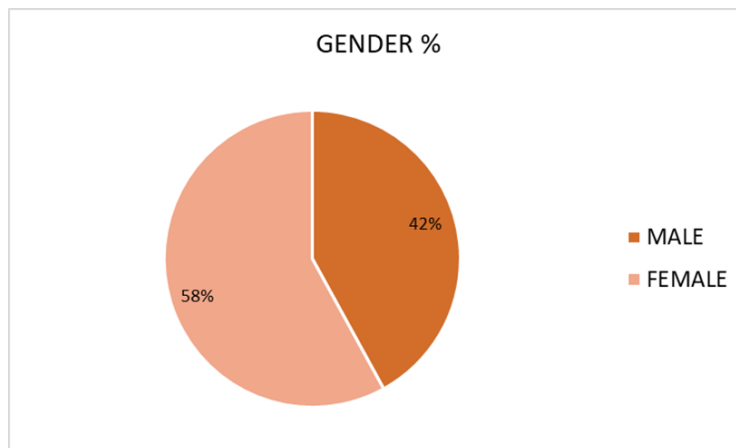


Fig.2.

**Prevalence of fracture healing among the study subjects :**

The figure illustrates that out of total (n=100), quicker healing and fracture union has taken place in the first 50 members (Test group) when compare to the last 50 members (Control group). Test group patients who have been treated with *Cissus Quadrangularis* have shown maximum fracture union within the 1<sup>st</sup> and 2<sup>nd</sup> follow up (6<sup>th</sup> to 12 weeks) whereas Control group patients who haven't treated with *C. quadrangularis* have shown the maximum no. of fracture union within the third follow up (16 weeks).

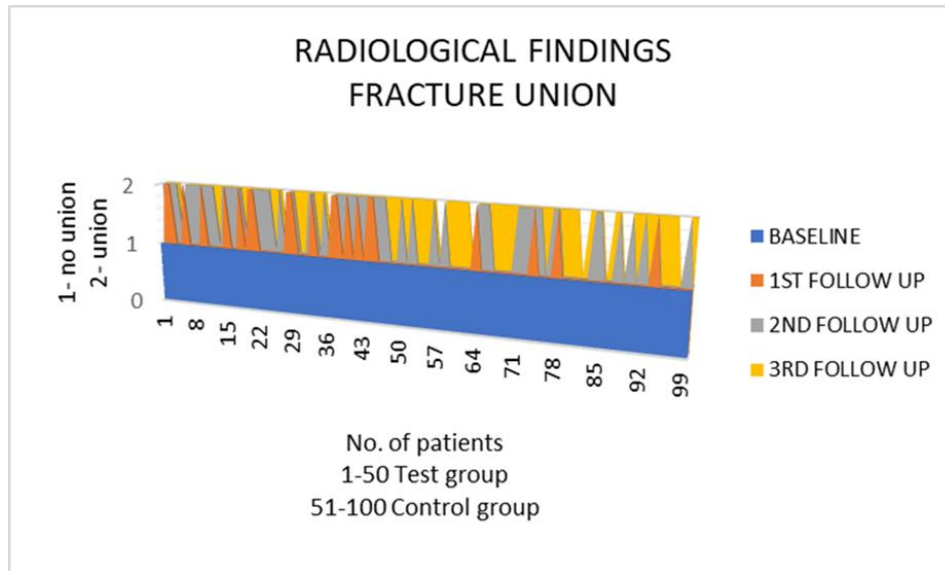


Fig.3.

**Prevalence of pain intensity among the study subjects:**

The figure illustrates that out of total (n=100), faster reduction in pain is seen in the first 50 members (Test group) when compare to the last 50 members (Control group).

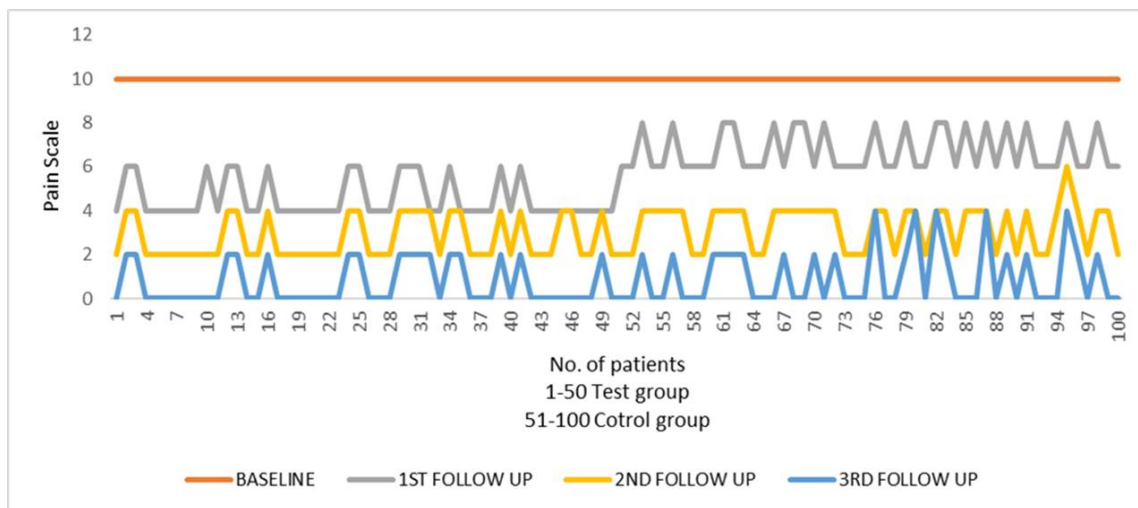


Fig.4.

**Prevalence of Swelling among the study subjects:**

The figure illustrates that out of total (n=100), less no. of peaks are seen in the first 50 members (Test group) indicating there is decrease in swelling when contrast to the last 50 members (Control group) where no. of peaks are more.

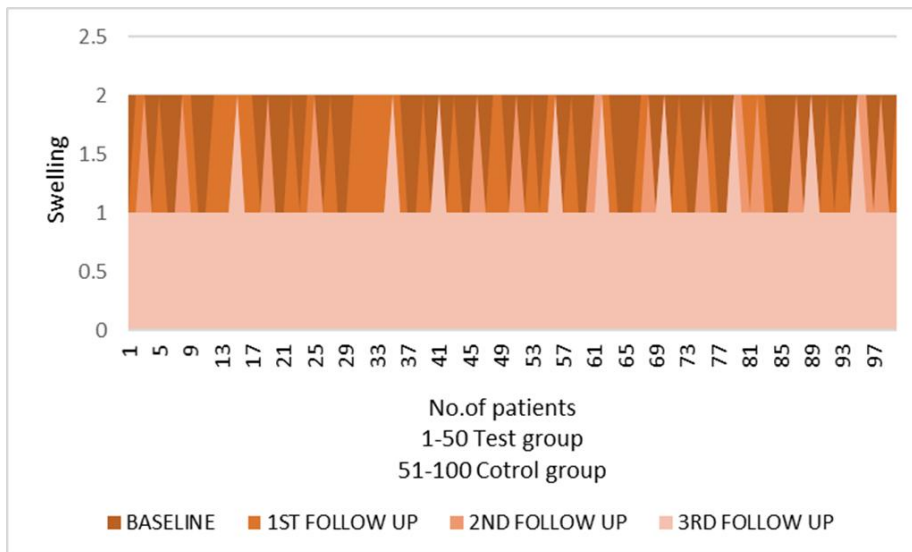


Fig.5.

**Assessment of sleep disturbance due to fracture among the study subjects:**

In this study out of total (n=100), 42% of patients are having disturbance of sleep due to fractures and 58% without any sleep disturbance.

Table. 3.

SLEEP DISTURBANCE	NO. OF SUBJECTS
YES	42
NO	58

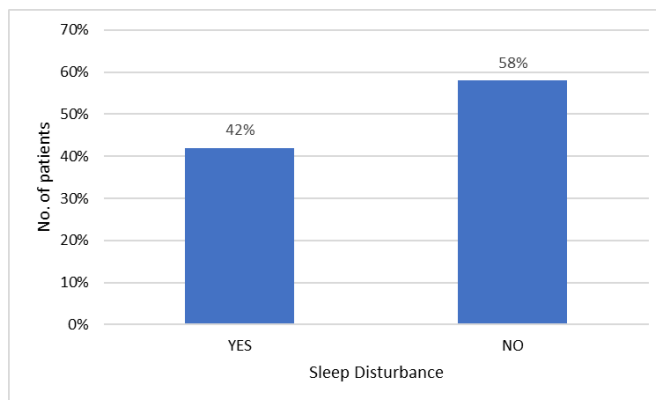


Fig.6.

**Mean VAS pain scores:**

Test mean scores are lower than control mean scores. There was decrease in the mean pain scores at the end of the study.

Table. 4.

GROUP	<sup>TH</sup> 6 WEEK	<sup>TH</sup> 12 WEEK	<sup>TH</sup> 16 WEEK	MEAN REDUCTION IN PAINSCORE
TEST	4.56	2.72	0.64	3.92
CONTROL	6.72	3.32	1.00	5.72

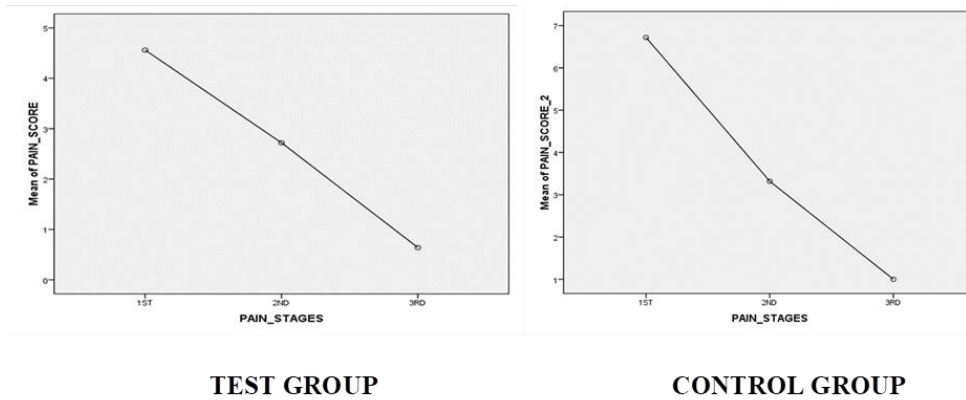


Fig.7.

**Statistical Chisquare values for test group and control group:**

The Chisquare values for the above data is ( $\leq 0.05$ ), which indicates that the healing action of fractures is significant.

**TEST**

Table. 5.

n=50	Mn±SD	Change in Score Mn±SD	Chisquare value	'P'	Significant
<b>Radiological findings</b>					
Baseline	2±0	-	-	-	-
6 weeks	1.66 ± 0.47	0.34±0.69	7.265	<0.05	Sig
12 weeks	1.22±0.41	0.78±0.57	6.523	<0.05	Sig
16 weeks	1.06±0.23	0.94±0.45	4.545	<0.05	Sig
<b>Pain</b>					
Baseline	10±0	-	-	-	-
8 weeks	4.56±0.90	5.44±0.92	7.906	<0.05	Sig
12 weeks	2.72±0.97	7.28±1.08	9.008	<0.05	Sig
16 weeks	0.64±0.94	9.36±1.21	11.315	<0.05	Sig

**CONTROL**

Table. 6.

n=50	Mn±SD	Change in Score Mn±SD	Chisquare value	'P'	Significant
<b>Radiological findings</b>					
Baseline	2±0	-	-	-	-
6 weeks	1.92±0.27	0.08±0.86	9.908	<0.05	Sig
12 weeks	1.6±0.49	0.40±0.69	8.821	<0.05	Sig
16 weeks	1.12±0.32	0.88±0.54	6.752	<0.05	Sig
<b>Pain</b>					
Baseline	10±0	-	-	-	-
8 weeks	6.72±0.90	3.28±1.32	3.000	<0.05	Sig
12 weeks	3.32±1.03	6.68±1.46	5.657	<0.05	Sig
16 weeks	1.00±1.35	9.00±1.51	8.333	<0.05	Sig

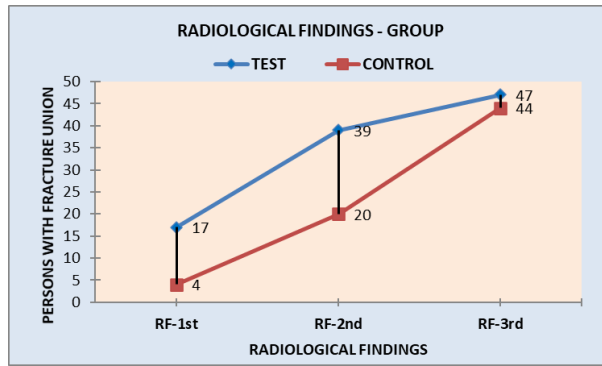


Fig.8.

**INFERENCE:**

Radiographic interpretation was done which showed there was significant radiographic evidence of the early healing of the fracture in the case treated with *Cissus quadrangularis* (test group) followed by control group [Tables 4 & 5 and Fig.7].

**Gender wise Fracture healing:**

In this study, out of total number of subjects(n=100), the average time taken for fracture healing is less in men compared to that of women .In the above figure, the peaks indicate union.

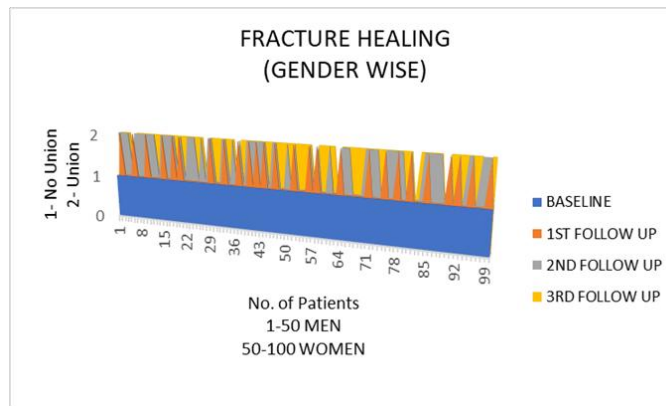


Fig.9.

**Age wise Fracture healing:**

In this study, out of total number of subjects(n=100), the average time taken for fracture healing is maximum in the age group 18 years to 35 years comparatively. In the above figure, peaks indicates union.

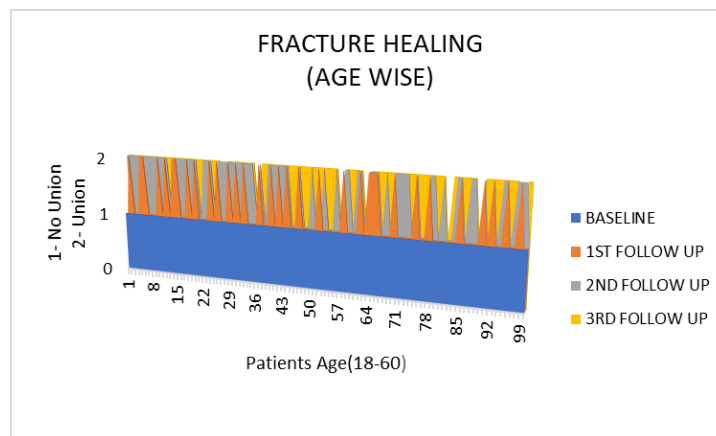


Fig.10.



## DISCUSSION

In this study, 100 subjects were recruited. The incidence of fractures was more in the age group of 50-60 years (33%) The prevalence of fractures increases with increase in the age. (Table.1 and Fig.1). Females (58%) were more prone when compared to males (42%) (Table.2 and Fig.2). The prevalence of fracture healing, pain intensity and swelling is lower in TEST group than the CONTROL group( Fig.3, 4 and 5). Out of total(n=100), 42 were reported abnormal sleep indicating their severity of pain and discomfort due to fracture which was affecting their sleep patterns.(Table.3 and Fig.6).

From Table 4, The mean pain score in test group reduced significantly from 4.56 to 0.64 and the mean pain score in control group reduced from 6.72 to 1.00. The mean reduction of VAS pain score in group A from 1st follow up to 3rd follow up was 3.92. The mean reduction of VAS pain score in group B from 1st follow up to 3rd follow up was found to be 5.72. This signifies that there was a statistically significant decrease in mean pain score( $p < 0.05$ ) in both the groups. Test mean scores are lower than control mean scores shows that significant reduction in pain intensity in TEST group when compared to CONTROL group(Fig.7). It is evident that early fracture healing was seen in the Test group who has taken *Cissus quadrangularis* (Tables 5 & 6 and Fig.8). Time taken for fracture healing was less in case of males when compared to females(Fig.9). Fracture healing was fast in case of younger people than the elderly people.(Fig.10)

It was observed that 34% of patients in group A and 8% of patients in group B has been recovered from fracture within the 6 weeks. 78% of the patients in group A and 40% of the patients in group B has been recovered from fracture within the 12 weeks where as 94% of the patients in group A and 88 % of the patients in group B has been recovered from fracture within the 16 weeks. Test group patients who have been treated with *Cissus quadrangularis* have indicated most fracture union within the first and second follow up (sixth to 12 weeks) though Control group patients who haven't treated with *Cissus quadrangularis* have demonstrated the greatest fracture union within the third follow up (four months).

In our study, efficacy of *Cissus quadrangularis* was observed by comparing Test group with *Cissus* and Control group without *C. quadrangularis*, in which we found that subjects treated with *Cissus quadrangularis* is more effective than the subjects treated without *C. quadrangularis*.

## CONCLUSION

In the present study, the period of immobilization was the lowest in the test group(group A) followed by the Control group (group B). *Cissus quadrangularis* helps in reducing pain, swelling, and fracture mobility and accelerate the healing of fracture bones. The duration of treatment is less and they showed better response when compared to other treatment options. Thus, we conclude that the use of such traditional drugs will not only be a breakthrough in the management and early mobilization of fractures, but will also prove to be a boon to the present-day life of industrialization, where many more cases of traumatic injuries are bound to occur.

The main purpose of conducting this study is, as we all know that fractures are very common in occurrence and it takes at least minimum of 3 weeks of bed rest for the person to continue his/her regular lifestyle. So, when we heard about the drug which can reduce the time of healing, we were intrigued to do a study on it. We also observed that they were very few studies conduct on this being a new drug, so we want to do this study and add on with those so that by taking this as a reference many studies would come up and it might included in Standard drug therapy of fractures.

## ACKNOWLEDGEMENTS

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### Funding

The study was not funded by any grant.

### Conflicts of Interest

No conflicts of interest have been declared.

### Informed Consent

Informed consent was obtained from all individual participants included in the study.

### Ethics Approval

All procedures performed in studies involving human participants were in accordance with the ethical Standards of the Institutional Ethics Committee



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