

## A COMPARATIVE STUDY TO EVALUATE THE EFFICACY OF SPLINTED BANDAGE WITH MURIVENNA AND PLASTER OF PARIS IN THE MANAGEMENT OF COLLES FRACTURE

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### ABSTRACT

**Objectives:** Colles fracture, a common injury in fracture clinics is the fracture at the distal end of the radius. Management of Colles fracture include closed reduction and plaster of paris application but heavy weight of plaster application and complications like joint stiffness, itching and plaster sores are common complaints. The traditional bone setting techniques using splinted bandage using *murivenna* oil produces better relief and lesser complications. The present study evaluate the efficacy of splinted bandage with *murivenna* when compared to plaster of paris application in Colles fracture **Methodology:** The patients diagnosed as Colles fracture satisfying the inclusion and exclusion criteria were recruited into two groups of 10 each by simple randomization. In group I splinted bandage with *murivenna* was done and in group II plaster of paris was applied. **Results and Conclusions:** The study concluded that splinted bandage with *murivenna* has shown encouraging result by providing relief to symptoms like pain, tenderness, swelling and also improved range of movement of wrist joint when compared to the application of plaster of paris in Colles fracture.

**Keywords:** Fracture, Colles fracture, *Murivenna*, Bandage, Splint, Ayurveda

### INTRODUCTION

Fragility fractures are now recognized as major problem of public health. More than one million osteoporotic fractures occur each year.<sup>1</sup> Although the prevalence of all fractures is similar among men and women, the vast majority of osteoporotic fractures

occur in elderly women. Colles fracture is a common injury affecting 17% of women over the age of fifty years. It is seen more often than any other injury in fracture clinic in civilian practice. This common fracture remains one of the most challenging of the

fractures that are treated by closed reduction techniques. Colles fracture is the fracture at the distal end of the radius within 2.5cm of the wrist with or without avulsion of the ulnar styloid process and with a characteristic deformity.<sup>2</sup> Colles fracture is managed by Reduction, Retention (Immobilization) and Rehabilitation.

In Ayurveda classics *acharya* Susruta deals the treatment aspect of *bhagna* in *chikitsasthana*. The main principle of fracture treatment is *Bhagnasthapana* (reduction), *Bhagnasthreekarana* (retention), and *Punercheshtapracharam* (rehabilitaion). Before going to *sthapanopayas* first reduce the local swelling and inflammation by *alepana* and *parisheka*. This will help to reduce the inflammation developed over the area. *Acharya* susruta has also advocated the principles of reducing the fracture.<sup>3</sup> They are *Anchana* (Traction), *Peedana* and *Samkshepana* (Manipulative reduction) and *Bandhana* (Immobilization), which are practiced regularly even today. The main objective of a fracture care should be to give a better management by promoting the proper healing without forming any deformity and make a fully functioning part within a limited period of time with maximum rest.<sup>4</sup> After proper reduction, immobilization is practiced using proper bandaging techniques. Different types of splint made from bark of trees like Bamboo, Ficus, Arjuna tree etc can be used for retention purpose. The materials which are used for *vranabandhana* (wound care) can be used for bandaging the fracture. In traditional fracture healing practice of Kerala, splinted bandage with *murivenna* oil (ingredients as given in table no.2) has been in use for the same purpose. And it has been observed that the traditional bone setting techniques using splinted bandage produces better relief and lesser complications. Hence the present study was planned to evaluate the efficacy of splinted bandage with *murivenna*<sup>5</sup> when compared to plaster of paris application in Colles fracture

## Materials and Methods

The patients diagnosed as Colles fracture was collected from the OPD and IPD of Govt. Ayurveda College Hospital, Thiruvananthapuram irrespective of their age, sex, religion, occupation etc. Patients were diagnosed on the basis of signs and symptoms based on Ayurveda as well as modern texts. The study was initiated after getting Institutional Ethics Committee clearance. Written informed consent was taken from each patient at the time of registration.

### Inclusion criteria

Patients between the age group 30 and 60 years of either gender diagnosed as Colles fracture both clinically and radiologically.

### Exclusion criteria

Patients below 30 years of age and above 60 years were excluded from the study. Patients with Open Colles fracture, with any major systemic illness DM, TB and having low serum calcium level were also excluded from the study

### Laboratory investigations

Laboratory investigations such as Hb (Gm%), Total RBC (Million/cmm), Total WBC (Million /cmm), Differential count (DLC), ESR (mm falls after 1 hour), RBS (mg/dl), Serum cholesterol (mg/dl), Serum calcium (mg/dl) were done at baseline treatment.

### Radiological investigation

X-ray wrist joint (AP view & Lateral view) were taken before and after treatment

### Grouping and posology

The patients satisfying the inclusion criteria were recruited into two groups by simple randomization. There were 10 patients in each group. The study duration in both groups was for 2 months including one month follow up period.

In group I splinted bandage with *murivenna* was done in 10 patients of Colles fracture

In group II plaster of paris was applied in 10 patients of Colles fracture.

Both pre and post assessment was done on the basis of clinical signs and symptoms. The post assessment

was done on the 30<sup>th</sup>, 45<sup>th</sup> and 60<sup>th</sup> day. The complications were assessed during the follow up period.

### Procedure

#### Group I

After reduction in Group I, gauze dipped in *murivenna* was applied on the fracture site. Then the cotton bandage along with splintage with bamboo was done. This was changed every week and re-banded with fresh materials retaining the optimum position of the limb for one month

#### Group II

In Group II, dry gauze was applied first after reduction. Next the cotton bandage was done. Then, after proper wetting, POP was applied on the forearm and wrist with proper molding. This patient was advised to keep the applied POP as such for one month.

The internal Medication for both the groups included *Musthadi kashayam* (90ml bid), *Dhanwantharam kashayam* (90ml bid) and *Lakshaguggulu gulika* (2 bid)<sup>6</sup>

### Assessment criteria

#### Subjective parameters

The gradation for symptoms such as pain, tenderness, and swelling was done (Table no.1) and was assessed before and after the completion of treatment

#### Radiological parameters

The X- ray of the wrist joint was taken before and after the treatment for the assessment of healing.

### Statistical analysis

The data collected was recorded in a master sheet separately for each group. Statistical tables and graphs were constructed for proper analysis. The statistical tests used are Chi square test, Wilcoxon Signed Ranks test, Mann – Whitney U test. Chi square test is done to compare the percentage changes in both groups. Effect of the treatment within the group is compared by Wilcoxon Signed Rank test. Effect of the treatment between the two groups is compared by Mann – Whitney U test.

### Observations

When the parameter pain was assessed, it was found that in the group I only 50% was complained with

mild pain and rest of them had no pain after 6 weeks of treatment where as in group II for 60% there was moderate pain and for 40% there was mild pain after 6 weeks of treatment. There was a significant reduction in pain in both groups *BT & after 4 wks.*, *after 4 wks. & After 6 wks.*, and *BT & after 6 wks.* ( $p < 0.05$ ). When the comparison of effectiveness on pain was assessed, Group I had significantly more improvement in pain during *BT- After 4 weeks* of treatment than the group II ( $p < 0.05$ ). But the observed difference in improvement in pain during the period *After 4 weeks - After 6 weeks* among the group I and the group II was not statistically significant ( $p > 0.05$ ). Group I had significantly more improvement in pain during *BT- After 6 weeks* of treatment than the group II ( $p < 0.05$ ). When the parameter tenderness was assessed, it was found that in the group I 90% complained with grade I tenderness and rest of them had no tenderness after 6 weeks of treatment where as in group II for 20% there was grade III tenderness and for 80% there was grade II tenderness after 6 weeks of treatment. There was a significant reduction in tenderness in both groups *BT & after 4 wks.*, *After 4 wks. & After 6 wks.*, and *BT & after 6 wks.* ( $p < 0.05$ ). When the comparison of effectiveness on tenderness was assessed, Group I had significantly more improvement in tenderness during *BT- After 4 weeks* of treatment than the group II ( $p < 0.05$ ). But the observed difference in improvement in tenderness during the period *After 4 weeks - After 6 weeks* among the group I and the group II was not statistically significant ( $p > 0.05$ ). Group I had significantly more improvement in tenderness during *BT- After 6 weeks* of treatment than the group II ( $p < 0.05$ ). When the parameter swelling was assessed, it was found that in the group I 60% complained with mild swelling and rest of them had no swelling after 6 weeks of treatment where as in group II for 50% there was moderate swelling and rest of them had mild swelling after 6 weeks of treatment. There was a significant reduction in swelling in both groups *BT & after 4 wks.*, *After 4*

wks. & After 6 wks., and BT & after 6 wks. ( $p < 0.05$ ). When the comparison of effectiveness on swelling was assessed, Group I had significantly more improvement in swelling during BT- After 4 weeks of treatment than the group II ( $p < 0.05$ ). But the observed difference in improvement in swelling during the period After 4 weeks - After 6 weeks among the group I and the group II was not statistically significant ( $p > 0.05$ ). Group I had significantly more improvement in swelling during BT- After 6 weeks of treatment than the group II ( $p < 0.05$ )

Splinted bandage with *murivenna* group showed high significance in reducing pain, tenderness and swelling when compared to plaster of paris group BT & after 4 wks. and BT & after 6 wks.

When the comparison of effectiveness on movements was assessed, it was found that in all cases the observed difference is significant i.e. Group I had more improvement in movements than Group II. But the statistical significance exists only in the case of flexion, abduction and supination. Group I had significantly more improvement in movements like flexion, abduction and supination after treatment than the group II ( $p < 0.05$ ). When the comparison of effectiveness on deformity was assessed, there is no significant difference between Group I and II after treatment. When the parameter clinically united was assessed, it was found that the symptoms of clinically united were present in 60% in case of Group I and only 30% in case of Group II. Here group I had significantly more improvement than Group II. When the parameter stiffness was assessed, it was found that the observed difference is significant. But there is no statistical difference between group I and group II in case of stiffness after follow up. When the parameter malunion was assessed, it was found that the observed difference is significant. But there is no statistical difference between group I and group II in case of malunion after follow up. When the parameter painful wrist was assessed, it was found that group I had significantly more improvement than Group II.

## DISCUSSION

In the study, the treatment modalities selected are splinted bandage with *murivenna* for group I and plaster of paris for group II. And it is found that splinted bandage with *murivenna* is very effective in reducing signs, symptoms and complications than plaster of paris group.

This is due to the add-on effect of *murivenna* in group I. The anti-inflammatory effect of *murivenna* has been proved experimentally and clinically. Due to this anti-inflammatory effect, *murivenna* reduces pain, tenderness and swelling in group I when compared to group II. The overall effect of *murivenna* is *tridoshasamana*. And more than this *yoga prabhava* of the drug acts here. *Murivenna* also shows healing properties. In *murivenna* the medium used is coconut oil, which is having *seeta veerya* suddenly reduces inflammation. is prepared in *dhanyamla*, which is *sparsa seeta*, so sudden cooling effect to the skin reduces *kshathoshma*. The main principle is *sandhana*, the drugs of *murivenna* is having *sandhaneeya* property. *Susrutha* has mentioned that it is the *veeryam* of the externally applied medicines that enters the ending of the *damanis*. As the active ingredients are dissolved in the liquid fat they can be easily diffuse into deeper layers of skin. Splints of bamboo are selected since they are used traditionally for bone settings. Compared to plaster of paris these bamboo splints are found very comfortable to the patients. Plaster of paris produces heavy weight to the patient. Compared to this bamboo splints are having less weight. The patients with Plaster of paris always requested to remove the bandage due to overweight. Bamboo is having *seeta veerya*. Plaster of paris produces feeling of hot inside the bandage and patients complaints more itching. While in the other group the splinted bandage was changed every week with fresh materials that the complaint of itching was not there. Plaster sores are a dreaded complication in case of POP bandage. But these complications can't be met in case of splinted bandage.

These plasters are providing only mechanical protection to internal tissues beneath the skin.

### CONCLUSION

The present study concluded that splinted bandage with *murivenna* has shown encouraging result on the case of Colles fracture by providing relief to symptoms like pain, tenderness, swelling and also improved range of movement of wrist joint when compared to the application of plaster of paris.

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Figure 1: Swelling of wrist joint in Colles fracture



Figure 2: X-ray of Wrist joint AP and Lat View-Colles fracture



Figure 3: Reduction of Colles fracture



Figure 4: Splinted bandaging in Colles fracture

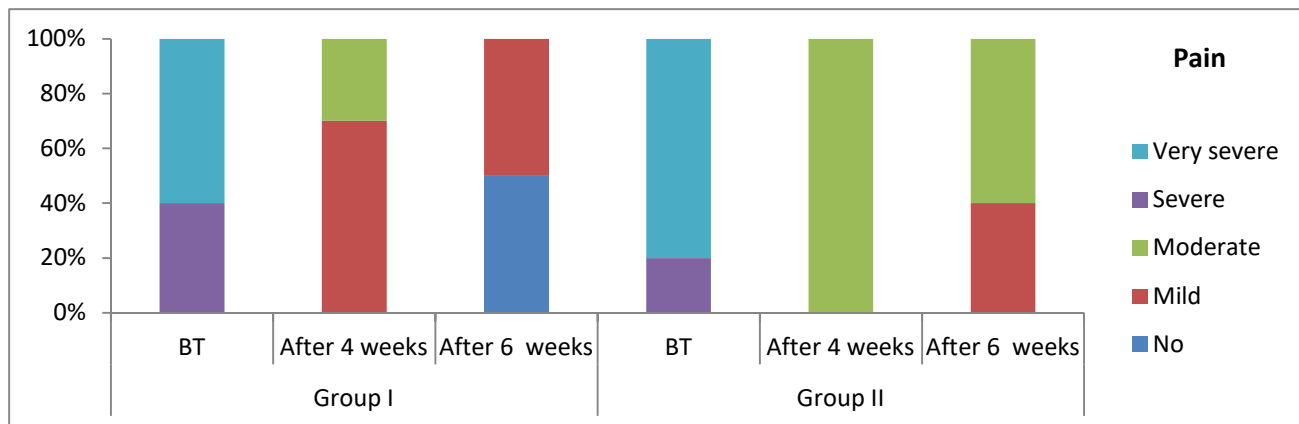
Table 1: Assessment criteria

S. No	Signs and symptoms	Grading
a)	Pain and swelling	0 – no pain 1 – mild 2 – moderate 3 – severe 4 – very severe
b)	Tenderness	0 - No 1 - Just suspect 2 - Patient winces on pressure 3 - Patient winces and withdraws 4 - Patient will not allow touching

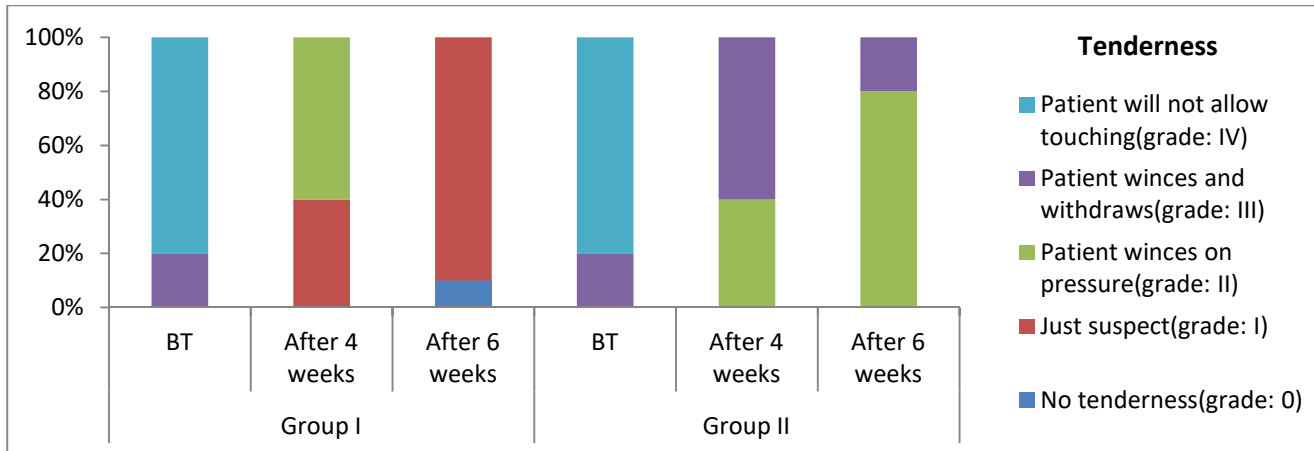
c)	Movements - Wrist joint	0 - No movement 1 - Slight movement 2 - Complete movement
d)	Deformity :	0 - Absent 1 - Present
e)	Symptoms of clinical union	0 - Absent 1 - Present
f)	Stiffness of wrist	0 - No 1 - Mild 2 - Moderate 3 - Severe

**Table 2:** Ingredients of *Murivenna*

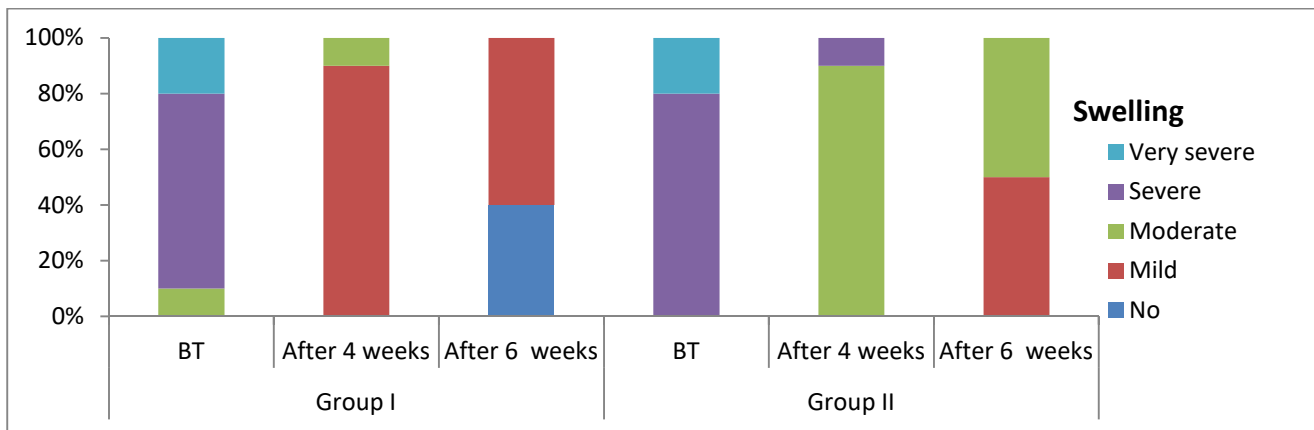
Sr no	Sanskrit Name	Botanical Name	Family	Part used	Quantity
1	Kumari	<i>Aloe vera Tourn ex Linn</i>	Liliaceae	leaves	384 gm
2	Palandu	<i>Allium cepa Linn</i>	Liliaceae	bulb	384 gm
3	Paribhadra	<i>Erythrina indica Lam</i>	Papilionaceae	leaves	384 gm
4	Karanjapatra	<i>Pongamia pinnata(L)Pierre</i>	Fabaceae	Stem bark	384 gm
5	Madangandhi	<i>Borreria articularis (Linn.f)</i>	Rubiaceae	Whole plant	384 gm
6	Thamboolapatra	<i>Piper betle Linn</i>	Piperaceae	leaves	384 gm
7	Shigrupatra	<i>Moringa oleifera Lam</i>	Moringaceae	leaves	384 gm
8	Satavari	<i>Asparagus racemosus Willd</i>	Liliaceae	root	144 gm
9	Coconut oil				768ml
10	Rice water				768ml
11	Water				3.07L



**Figure 5:** Effectiveness of treatment on pain within the Group I and II



**Figure 6:** Effectiveness of treatment on tenderness within the Group I and II



**Figure 7:** Effectiveness of treatment on swelling within the Group I and II

**Source of Support: Nil**

**Conflict Of Interest: None Declared**

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