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# CLINICAL STUDY ON IMMOBILISATION USING VAMSHA KUSHA BANDHA WITH RAKTHA CHANDHANA TRIPUTAH TRIPHALA AND HARIDRA IN COMPARISON TO PLASTER OF PARIS CAST IN THE MANAGEMENT OF COLLES' FRACTURE

**Saifudheen P[1], Siddayya Aradhyamath[2], Ravikiran[3], Rohit. K. S[4], Tushar Pimpale[5]**

[1]M S Scholar (Ayu), Dept. Of Shalya Tantra, JSS AMC, Mysore,
[2]Professor & HOD, Dept. Of Shalya Tantra, JSS AMC, Mysore,
[3]Asst. Professor, Dept of Orthopaedics, JSS MCH, Mysore,
[4]Research officer, Ayu Narip, Cheruthuruthy
[5]M S scholar, Dept of Orthopaedics, JSS MCH, Mysore.
JSS AMC & JSS Medical College Hospital, Mysore, Karnataka, India

**Email:** drsaifup@gmail.com

## ABSTRACT

**Background of the study:** In the management of fractures, immobilization is practiced using *VAMSH (Bamboo) KUSHA (Splints) BANDHA (Bandage)* in traditional fracture healing practice and in conventional orthopedic practice PLASTER OF PARIS CAST is frequently opted. Colles' fracture is a common injury affecting women over the age of forty years. Here the study has been selected to know the efficacy by comparing.

**Methodology:** A comparative study was conducted to assess the efficacy of *Vamsha Kusha Bandha* with Traditional herbal formulation and Plaster of Paris cast in the management of colles' fracture. The patients were recruited into two groups following randomized controlled sampling with 20 patients in each group. Group A received *Vamsha Kusha Bandha* with Traditional herbal formulation and the group B received plaster of Paris cast as treatment modality. The study duration in both groups was for 12$^{th}$ weeks including 6 weeks follow up period. Signs, symptoms and complications were assessed before treatment, after treatment, and during follow up using required assessment scales. The data were analyzed using the most appropriate statistical tests.

**Results:** *Vamsha Kusha Bandha* with Traditional herbal formulation showed high significance in reducing signs, symptoms of colles' fracture when compared to plaster of Paris cast at 6$^{th}$ week. *Vamsha Kusha Bandha* with Traditional herbal formulation is very effective in treating a Colles' fracture. And also can reduce the Rehabilitation time.

**Keywords:** Colles' Fracture, *Vamsha Kusha Bandha*, Plaster of paris cast, Traditional Herbal formulation.

## INTRODUCTION

The *Susrutha Samhitha* is an encyclopedia of medical learning with special emphasis on Shalya tantra. *Sushruta* has described the entire orthopedic surgery, including measures of rehabilitation. The signs, symptoms, methods, principles management of *Bhagna* were very similar to modern principles of management of fractures.

*Acharya Susrutha*[1] has advocated the principles of reducing the *Bhagna*, they are *Anchana* (Traction), *Peedana* (Compression), *Samkshepana* (Manipulative reduction or Elevation) and *Bandhana* (Bandage), which are practiced even today. *Pathya Apathya* for *Bhagna*, *Apathya*[2] mentioned are *Katu, Ksara* and *Amla* which will cause *Vata Pitta Kopa* and adversely affect *Bhang sandhana*, *Pathya* mentioned are *Shaali, Mamsarasa, Ksheera, Sarpi, Yusha, Brimhana Annapana* which will help for the early and proper healing.[2]In traditional fracture healing practice *Vamsha Kusha*[3] *Bandha* has been in use for the same purpose. And it has been observed that the traditional bone setting technique using *Vamsha Kusha* produces better relief and lesser complications. The present study has been undertaken to evaluate the efficacy of *Vamsha Kusha Bandha* with Traditional herbal formulation in comparison to plaster of Paris cast.

**Aim and objectives**

1. To evaluate the efficacy of *Vamsha Kusha Bandha and Raktha Chandana Triputa, Triphala, Haridra* in the management of Colles' fracture
2. To compare the efficacy of *Vamsha Kusha Bandha* and *Raktha Chandana, Triputa, Triphala, Haridra* with plaster of Paris cast in the management of Colles' fracture

**METHODOLOGY**

- Study design–Randomized controlled clinical trial.

Group A–*Vamsha Kusha Bandha* with traditional herbal formulation

Group B–Plaster of Paris Cast

- Study duration–12th week
- Sample size–20 patients in each group.
- Selection of patients–as per Inclusion and Exclusion criteria
- Study population–The patients diagnosed as Colles' fracture
- Attending the OPD of JSS A H, and JSS M Hospital, Mysuru.

**Method of collection of data:**

Complete clinical data were collected from all selected patients as per proforma before the intervention and every follow up until the completion of the study. Results obtained were statistically analyzed and discussed.

**A. Inclusion Criteria**

- Patients with clinical features of Colles' fracture diagnosed by an X–ray
- Age between 30 to 60 yrs.
- Irrespective of gender

**B. Exclusion Criteria**

- Open Colles' fracture with complications.
- Patients with any systemic illness like DM, TB and other infectious Diseases
- Osteo myelitis
- Bone tumor.

**Diagnostic criteria**[4]:

- *Swayathu Bahulyam*.(Marked swelling.)
- *Vivartanasahishnutwam*.(Loss of movements.)
- *Sparsasahishnutwam*.(Tenderness.)
- *Vividha Vedana Pradurbhava*.(Different type of pain.)
- *Srasthangatha*(Deformity)
- X-ray

Investigations

- CBC, Sr.Urea, Sr.Creatinin.
- X-Ray
- Other tests if necessary

Assessment Criteria:

- Improvement in the following parameters was considered for the assessment of efficacy. Assessment of the therapy was done according to the scoring technique observed in the relief of

signs and symptoms of the disease and also complications.

**SUBJECTIVE PARAMETERS:**

- Pain.
- Stiffness.

**OBJECTIVE PARAMETERS:**

- Tenderness.
- Movements.
- Swelling.
- Visible deformity.

**Intervention**

***Poorvakarma*- Group A**

Collection of the materials required

- *Rakthachandhana*[5], *Triputah*, *Triphala* and *Haridra*.
- Gauze
- Cotton
- Splints of bamboo (4 In number)
- Bandage cloth (Cora cloth)
- Sling

***Pradhanakarma***

Let the patient to ask to lie down on a table or to sit comfortable on a stool as according to the condition of the patient and convenience of the physician.

Reduction was done by closed manipulative method involving three stages (Without anesthesia)

A*nchana, Peedana, Samkshepana*[6].

After reduction Traditional herbal formulation was prepeared by *Rakthachandhana* , *Triputa*, *Triphala* and *Haridra* , Then 20 gm of this *Churna* was taken and mixed with 1egg white ,This paste was applied on the cotton cloth were wrapped from distal part of metacarpal to shaft of forearm .Then the cotton Cora bandage along with *Vamsha Kusha* was done.

Four splints were selected according to the size of forearm of the patient. *Sama Bandha* was done in *Shaka Pradesha*. For immobilizing the wrist joint *Swasthika Bandha* and immobilizing forearm *Anuvelitha Bandha* was done with cotton Cora cloth. Then the forearm was immobilized with *Utsangi Bandha*.

After the reduction, the same procedure was repeated on every three days up to 6th weeks.

***Paschatkarma***

Examination for the impairment of circulation identified by distal peripheral pulse or nail circulation.

Re bandaging was done every third day.

After 6th week splint was removed followed by simple bandage with Ayurvedic rehabilitation like *Mrit Pinda*, *Lavana Pinda*, and *Pashana Pinda Dharana* for next 6 weeks.

***Poorvakarma*-GroupB**

a. Plaster of Paris cast

b. Gauze

c. Cotton

d. Water

e. Sling

***Pradhanakarma***

Patient was asked to lie down on a table or to sit comfortable on a stool as according to the condition and convenience of the patient and physician.

Reduction[7] was done by disimpaction, Palmar flexion and Ulnar deviation.(without anesthesia)

AfterReduction-The assistant maintained traction on the thumb while a plaster back slab 6''(15.2cm)wide, was applied over a thin layer of orthopedic wool special care being taken to pad the styloid process of ulna. The slab extended from the metacarpal heads to just below the elbow and surrounds two-thirds of the circumference of the forearm. It was held in position with a cotton bandage.

The slab maintained the ulnar deviation of the hand by a tongue of plaster shaped to the index metacarpal, this was for 1week. After one week, the plaster cast was not extended over the radial side of the thumb metacarpal for fear of an adduction deformity of the thumb.

While the plaster was setting the surgeon moulded the wrist, in the same way as when reduction of fractured wrist was held in a few degrees of flexion and full ulnar deviation. This plaster cast was kept for 2weeks and after 2weeks again re-plaster cast was done for 3weeks.

***Paschatkarma***

- Examination was done for impairment of circulation and identified by distal, peripheral pulse .
- POP was changed after1st, 3rd and 6th week.
- POP cast was removed after 6th week Physiotherapy like flexion, extension, pronation, supination movements were done for next 6 weeks.

**OBSERVATION, ANALYSIS & INTERPRETATION**

**Percentage Distribution According to the Cause**

Group A, 75 % the cause was fall and for 25 % the cause was RTA. While among group B, 60 % the cause was fall and 40% the cause was RTA.

**1. PAIN**

**A. Comparison of PAIN between the group A and group B:**

**Table 1:** Mann-Whitney U test

| Duration | Change(PAIN) | Group A | | Group B | | Test statistics |
|---|---|---|---|---|---|---|
| | | N | % | N | % | |
| 6 weeks | Nil | 12 | 60.0 | 2 | 10.0 | U=94.00 |
| | Mild | 6 | 30.0 | 12 | 60.0 | P=.002 |
| | Moderate | 2 | 10.0 | 6 | 30.0 | |
| | Severe | 0 | 0 | 0 | 0 | |
| 12 weeks | Nil | 20 | 100.0 | 18 | 90.0 | U=180.0 |
| | Mild | 0 | 0 | 2 | 10.0 | P=.602 |
| | Moderate | 0 | 0 | 0 | 0 | |
| | Severe | 0 | 0 | 0 | 0 | |

From the above table it is clear that at 6 weeks comparison, group A recorded significantly higher reduction in the pain compared to Group B. Mann-Whitney U value of 94.00 was found to be significant at 0.002 levels. However, at 12th week there was no significant difference between the groups in their level of pain reduction as the observed U value of 18.0.0 was found to be statistically non-significant.

2) **STIFFNES**

**B. Table 2:** Comparison of stiffness between the group A and group B

| Duration | Change | Group A | | Group B | | Test statistics |
|---|---|---|---|---|---|---|
| | | N | % | N | % | |
| 6 weeks | Nil | 14 | 70.0 | 0 | 0 | U=23.000 |
| | Mild | 4 | 20.0 | 2 | 10.0 | P= .000 |
| | Moderate | 2 | 10.0 | 15 | 75.0 | |
| | Severe | 0 | 0 | 3 | 15.0 | |
| 12 weeks | Nil | 18 | 90.0 | 10 | 50.0 | U=116.000 |
| | Mild | 2 | 10.0 | 6 | 30.0 | P= .005 |
| | Moderate | 0 | 0 | 4 | 20.0 | |
| | Severe | 0 | 0 | 0 | 0 | |

From the above table it is clear that at the level of 6th week comparison, group a recorded significantly higher reduction in the Stiffness compared to Group B. Mann-Whitney U value of 23.000 was found to be significant at the level .000. However, at 12th week there was significant difference between the groups in their level of Stiffness reduction as the observed U value of 116.000 was found to be statistically significant at the level 0.005.

3) **TENDERNESS**

**Table 3:** Comparison of tenderness between the group A and group B

| Duration | Change | Group A | | Group B | | Test statistics |
|---|---|---|---|---|---|---|
| | | N | % | N | % | |
| 6TH weeks | NO TENDERNESS | 16 | 80.0 | 6 | 30.0 | U=100.000 P= .002 |
| | SITE IS TENDER | 4 | 20.0 | 14 | 70.0 | |
| | PATIENT WINCES | 0 | 0 | 0 | 0 | |
| 12TH weeks | NO TENDERNESS | 20 | 100.0 | 16 | 80.0 | U=160.000 P= .037 |
| | SITE IS TENDER | 0 | 0 | 4 | 20.0 | |
| | PATIENT WINCES | 0 | 0 | 0 | 0 | |

From the above table it is clear that at the level of 6th week comparison, group A recorded significantly higher reduction in the tenderness compared to Group B. Mann-Whitney U value of 100.000 was found to be significant at .002 levels. However, at 12th week there was significant difference between the groups in their level of tenderness as the observed U value of 160.000 was found to be statistically significant at 0.037 levels.

4) **SWELLING**

**Table 4:** Comparison of swelling between the group A and group B

| Duration | Change | Group A | | Group B | | Test statistics |
|---|---|---|---|---|---|---|
| | | N | % | N | % | |
| 6th weeks | Mild | 16 | 80.0 | 8 | 40.0 | U=120.000 P= .011 |
| | Moderate | 4 | 20.0 | 12 | 60.0 | |
| | Severe | 0 | 0 | 0 | 0 | |
| 12TH weeks | Mild | 20 | 100.0 | 18 | 90.0 | U=180.000 P= .152 |
| | Moderate | 0 | 0 | 2 | 10.0 | |
| | Severe | 0 | 0 | 0 | 0 | |

From the above table it is clear that at the level of 6th week comparison, group a recorded significantly higher reduction in the swelling compared to Group B. Mann-Whitney U value of 120.000 was found to be significant at .011 levels. However, at 12th week there was no significant difference between the groups in their level of swelling reduction as the observed U value of 180.000 was found to be statistically non- significant at 0.152 levels.

**5) MOVEMENTS**

**Table 5:** Comparison of Movements between the group A and group B

| Duration | Change | Group A | | Group B | | Test statistics |
|---|---|---|---|---|---|---|
| | | N | % | N | % | |
| 6 weeks | NO joint movements | 0 | 0 | 0 | | U=14.000 P= .000 |
| | < 50% | 0 | 0 | 16 | 80.0 | |
| | 50% | 2 | 10.0 | 3 | 15.0 | |
| | >50% | 18 | 90.0 | 1 | 5.0 | |
| 12 weeks | NO joint movements | 0 | 0 | 0 | 0 | U=170.000 P= .075 |
| | < 50% | 0 | 0 | 0 | 0 | |
| | 50% | 0 | 0 | 3 | 15.0 | |
| | >50% | 20 | 100.0 | 17 | 85.0 | |

From the above table it is clear that at the level of 6th week comparison, group A recorded significantly higher reduction in the movements compared to Group B. Mann-Whitney U value of 14.000 was found to be significant at .000 levels. However, at 12th week there was no significant difference between the groups in their level of movement reduction as the observed U value of 170.000 was found to be statistically non- significant at 0.75 levels.

6) **DEFORMITY**

**Table 6:** Comparison of deformity between the group A and group B

| Duration | Change | Group A | | Group B | | Test statistics |
|---|---|---|---|---|---|---|
| | | N | % | N | % | |
| 6th weeks | Absent | 20 | 100.0 | 20 | 100.0 | U=200.000 P= 1.000 |
| | Present | 0 | 0 | 0 | 0 | |
| 12TH weeks | Absent | 20 | 100.0 | 20 | 100.0 | U=200.000 P= 1.000 |
| | Present | 0 | 0 | 0 | 0 | |

From the above table of deformity, at the level of 6th week and 12th weeks, There was no significant changes in group A compared to group B. Mann-Whitney U value of 200.000 was found to be non-significant at 1.000 level in both group A and group B.

**Table 2:** Comparison of FRACTURE HEALING at the level of 6th week

| Symptoms of Clinically united | Group A | | Group B | | Total | |
|---|---|---|---|---|---|---|
| | **N** | **%** | **N** | **%** | **N** | **%** |
| Absent | 0 | 0 | 0 | 0 | 0 | 0 |
| Present | 20 | 100.0 | 20 | 100.0 | 40 | 100.0 |
| Total | 20 | 100.0 | 20 | 100.0 | 40 | 100.0 |

Both the groups the shown healed fracture site by callus formation which was radiologically visible was present at the level of 6th week.

**7).Comparison of complication**

**A. Comparison of stiffness 6th week (follow up)**

From the above table it is clear that at the level of 6th week comparison, group A recorded significantly higher reduction in the Stiffness compared to Group B. Mann-Whitney U value of 23.000 was found to be significant at .000 levels.

**A. Comparison of MALUNION -6th week**

From the above table of mal union, at the level of 6th week, there was no significant change in group A compared to group B.

**C. Comparison of painful wrist- 6th week**

From the above table it is clear that at the level of 6 week comparison, group A recorded significantly higher reduction in the pain compared to Group B. Mann-Whitney U value of 94.00 was found to be significant at 0.002 levels.

## DISCUSSION

**DISCUSSION ON DATA RELATED TO CLINICAL RESPONSE AFTER TREATMENT**

**Discussion on Pain**

When the parameter pain was assessed, In Group A, 60% were NIL and 30 % were mild pain after 6 weeks of treatment, where as in Group B, for 10% were NIL and for 60% were mild pain after 6 weeks of treatment. In Group A recorded significantly higher reduction in the pain compared to Group B. However, at 12th week there was no significant difference between the Groups in their level of pain reduction.

**Discussion on stiffness**

At the level of 6th week and 12th week comparison, Group A recorded significantly higher reduction in the Stiffness compared to Group B.

**Discussion on Tenderness**

When the parameter tenderness was assessed at 6th week, in Group A, 80 % were grade 0 and 20 % were grade 1, whereas in Group B, 30 % were grade 0 and 70 % were grade 1. Group A recorded significantly higher reduction in the Tenderness compared to Group B. At the 12th week in Group A 100 % were grade 0, where as in Group B, for 80 % were grade 0 and 20 % were grade 1. However, at 12th week Group A there was significant difference between compared to Group B.

**Discussion on swelling**

When the parameter swelling was assessed, at 6th week in Group A, 80 % were mild swelling and 20 % were moderate where as in Group B, 40 % were mild and 60 % were moderate. Group A recorded significantly higher reduction in the swelling compared to Group B. At the 12th week, In Group A, 100 % were mild swelling , where as in Group B, 90 % were mild and 10 % were in moderate. However, at 12th week there was no significant difference between the Groups in their level of swelling reduction

**Discussion on movements**

When the parameter on movements was assessed, at 6th week In Group A , 90 % were got more than 50 % movement and 10 % were got 50 % movements, where as in Group-B, only 5 % were got more than 50 % movement , 15 % were got 50 % movements and 80 % were got less than 50%. Group-A recorded significantly higher reduction in the movements compared to Group-B. At the 12th week, In Group-A, 100 % were got more than 50 % movement, where as in Group B, 85 % were got more than 50 % movement and 15 % were got 50 % movements However, at 12th week there was no significant difference between the Groups in their level of swelling reduction.

**Discussion on deformity**

When the comparison of effectiveness on deformity was assessed, there is no significant difference between Group A and Group B at 6th week and 12th week.

**Effectiveness and comparison of treatment on clinically united**

When the parameter clinically united was assessed.

**Discussion on Complications**

**On stiffness – 6$^{th}$ week**

When the parameter stiffness was assessed, it was found that Group A had significantly more improvement than Group B.

**On painful wrist – 6$^{th}$ week**

When the parameter painful wrist was assessed, it was found that GroupA had significantly more improvement than Group B.

**Probable action of both treatment modalities**

It was found that Group A was very effective in reducing signs, symptoms and complications than Group B especially on 6$^{th}$ week. This was due to add on effect of Traditional Herbal formulations in Group A.

The *Triputah* helps to reduce pain, tenderness and swelling in Group A when compared to Group B because of its *Shopha Nasanam* and *Angamardha hara* properties. Also having *Asthi Sandhaneeya* property.[8]

The overall effect of medicine is *Tridosha Samana*, and more than, the *Prabhava* of this yoga acts here. It also shows healing properties. The medium egg white was used for making paste.

*Susrutha* has mentioned that it is the *Veeryam* of the externally applied medicines that enters the ending of the *Damanis*. As the active ingredients can be easily diffuse in to deeper layers of skin. *Vamsha Kusha* was selected since they were used in *Ayurveda* for bone settings. It was found very comfortable to the patients as it was having less weight. It also has *Seeta Veerya* property.

Plaster of Paris cast causes discomfort to patient due to its heavy weight. Also patient complains of feel-

ing of more heat inside the POP cast. Patient had felt more itching because it was kept for more duration.

## CONCLUSION

- In the present study it was observed that the Colles' fracture was more common among Elderly women because of post- menopausal osteoporosis with the mechanism of trauma being a fall on an out-stretched hand, which was diagnosed by X-ray AP and lateral view.
- During the study *Vamsha Kusha Bandha* with Traditional herbal formulation(GroupA) was more effective clinically and Statistically in reducing signs and symptoms of Colles' fracture when compared to plaster of paris cast(GroupB) on 6thweek (after treatment).
- It was also observed that the patients in Group A required less rehabilitation time and went back to their routine work when compared to Group B.

Though statistically there was no difference in both the groups on 12$^{th}$week, yet clinically the patients in Group A far better.

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