OriginalResearch Article

ANALYSIS THE IMPROVEMENTS OF THE QUALITY OF LIFE IN AYURVEDIC TREATMENT FOR THE WRIST FRACTURE

ABSTRACT

Aims: The aim of this study was to analyze the improvements of the quality of life (QOL) in Ayurvedic treatment for the wrist fracture.

Study design: This is a Retrospective Cohort Study.

Place and duration of study: This study was carried out among the wrist fracture patients in Kadum bidum (orthopedic) Clinic who got treatment of wrist fracture at Bandaranayaks Memorial Ayurvedic Research Institute (BMARI).

Methodology: All wrist fracture patients attending the BMIRI clinic were selected for this research study, were interviewed and administrated Qualeffo-41 questionnaire to collect the data. Patients were divided into three groups (A - Patients who took ayurvedic treatment straightly, B - Patients who took ayurvedic treatment after getting western treatment and C - Patients who took ayurvedic treatment after getting alternative treatment). QOL were analyzed in the interventions. There are first visit, after the 6th week, after 3 months, and after the 6th month.

Results: In group A, they were getting quick improvement seen within 3months. QOL score changes from 16, 39, and 55. In group B, QOL score of patients who were getting treatment for 6th weeks QOL score changes from 18, 38.5. QOL of patients who were getting treatment for 6 months QOL change from 17, 26, 35, and 43. In group C, QOL of patients who were getting treatment for 3 month QOL changes from 21, 31.5, and 42.5. QOL score of patients who were getting treatment for 6 months QOL changes from 17, 24, 35 and 41.

Conclusion: The study patients were quickly improved by the Ayurvedic treatment indicating its efficacy in fracture management.

Key words: Quality Of Life, Wrist Fracture, Bhagna, Ayurvdic treatment

1. INTRODUCTION

1.1 Background of study

Ayurvedic medicine is a system of healing that originated in ancient India. The goal of Ayurveda is prevention as well as the promotion of the body's own capacity for maintenance and balance[15]. A bone fracture is a medical condition in which there is damage in continuity of the bone. A bone fracture can be the result of high force impact or stress or minimal trauma injury as a result of certain medical conditions that weaken the bones such as osteoporosis, bone cancer or osteogenesis imperfect[1].

Fragility fractures are common, 1 in 2 women over 50 years of age will suffer one, as will 1 in 5 men. Globally during the year 2000, there were estimated 9 million new fragility fractures, of which 1.6million were at the hip, 1.7million at the wrist, 0.7million at the humerus and 1.4million symptomatic vertebral fractures [13].

A wrist fracture is one of the common fractures. The wrist is made up of eight small bones which connect with the two long forearm bones called the radius and ulna. Although a broken wrist can happen in any of these 10 bones, by far the most common bone to break is the radius. This is called as a distal radius fracture by hand surgeons [1]. One of the most common distal radius fractures is a Colles fracture. It causes a much loss of quality of life both acute loss, immediately after the fracture & chronic loss because of recurrent fractures & disability due to incomplete recovery [1].

Quality of life (QOL) is the general well-being of individuals and societies, outlining negative and positive features of life. It observes life satisfaction, including everything from physical health, family, education, employment, wealth, religious beliefs, finance, and the environment. Several instruments have been developed for the assessment of the quality of life after wrist fracture. International Osteoporosis Foundation (IOF) developed a specific questionnaire for quality of life patients with wrist fracture [14].

The Ayurvedic term for fracture is Bhagna [7]. In Ayurveda, bone fractures were classified into two types "dislocation (Sandhimukta) and fracture (Kandabhagna)". Ayurveda offers effective treatment for rejoining bones and restoring them to their original form and strength. Generally, bone being a living tissue, constantly builds and hence rejoins and nourishes. The three fundamental principles of fracture treatment are Bhagna Sthapana (Reduction), Bhagna Sthirikara (Immobilization), Punah cheshta prasara (Rehabilit ation). In Ayurveda one of the important immobilization methods is bandaging for fracture. It classify into 15 types. Commonly spiral bandaging (anuvellita) is used to bandage around upper and lower limbs [4].

1.1 Justification

Many patients visit the Ayurveda hospitals for the fracture treatment. The Evaluation of the fracture healing effectiveness of Ayurvedic treatment is essentially important to identify whether the treatment is successful or not, So we did the study to analyze the wrist fracture healing effectiveness who came just for the Ayurvedic treatment, who came getting after the western treatment and who came getting traditional treatment.

2. PRIMARY & SECONDARY OBJECTIVES

Aim

To analysis the improvements of the quality of life in Ayurvedic treatment for the wrist fracture.

Objectives

- To analysis the quality of life to wrist fracture patients who tookayurvedic treatment straightly(A)
- To analysis the quality of life to wrist fracture patients who took ayurvedic treatment after getting western treatment(B)
- To analysis the quality of life to wrist fracture patients who tookayurvedic treatment after getting alternative treatment(C)

3. MATERIALS ANDMETHODOS

3.1 Study design & area

This is a Retrospective cohort Study. This study was conduct among wrist fracture patients in *Kadum bidum* clinic who came to the hospital for treatment of wrist fracture at Bandaranayaks Memorial Ayurvedic Research Institute.

3.2 Research Instruments:

Structured Interview administrated Questionnaire prepared based on Specific objectives & with the help of standard Qualeffo-41. Questionnaire for the research was prepared and checked by the Supervisor.

3.3 Main study

The research proposal was prepared and approval was taken from the Supervisor.

3.4 Data collection

Data was collected with the help of the interview administrated questionnaire from the *Kadum bidum* clinic patients who were affected by wrist fracture in order to do the main research.

3.5 Data Analysis

The data was tabled and analyzed using simple statistics as the next step of the research. The matters collected from the revised literature also analyzed in addition to the result of the research. The research report was prepared after the research results were achieved.

4. LITERATURE REVIEW

4.1 Fracture

A fracture may be a complete break in the continuity of a bone or it may be an incomplete break or crack.

Classification 1 - According to their etiology into 3 groups.

1. Fractures caused solely by sudden injury
2. Fatigue or stress fractures
3. Pathological fractures

Classification 2 - According to the pattern of fracture

Fractures are often designed by descriptive terms denoting the shape or pattern of the fracture surface as seen on radiographs. It may indicate the nature of causative violence & may thus give a clue to the easiest method of reduction

1. Transverse fracture
2. Oblique fracture
3. Spiral fracture
4. Comminuted fracture(with more than fragments)
5. Compression / Crush fractures
6. Greenstick fracture (incomplete breaks occurring only in the resilient bone of children)
7. Impacted fractures

Classification 3 - According to the soft tissue involvement

1. Closed fracture: are those in which they overlying skin is intact.
2. Open fracture / Compound fracture: involve wounds that communicate with the fracture, or where fracture hematoma is exposed, and may thus expose bone to contamination. Open injuries carry a higher risk of infection.
3. Clean fracture
4. Contaminated fractures[1].

Symptoms of bone fracture

The signs and symptoms of a fracture vary according to which bone is affected, the patient's age and general health, as well as the severity of the injury.

- Pain
- Swelling
- Bruising
- Discolored skin around the affected area
- Angulation - the affected area may be bent at an unusual angle
- The patient cannot move the affected area
- The affected bone or joint may have a grating sensation[1][11]

a. **Wrist fracture**

A wrist fracture is a medical term for a broken wrist. The wrist is made up of eight small bones which connect with the two long forearm bones called the radius and ulna. Although a broken wrist can happen in any of these 10 bones, by far the most common bone to break is the radius. This is called a distal radius fracture by hand surgeons[1].

Distal Radius Fractures (Broken Wrist)

The radius is the larger of the two bones of the forearm. The end toward the wrist is called the distal end. A fracture of the distal radius occurs when the area of the radius near the wrist breaks.

Distal radius fractures are very common. In fact, the radius is the most commonly broken bone in the arm[1].

Description

A distal radius fracture almost always occurs about 1 inch from the end of the bone. The break can occur in many different ways, however.

One of the most common distal radius fractures is a Colles fracture, in which the broken fragment of the radius tilts upward. This fracture was first described in 1814 by an Irish surgeon and anatomist, Abraham Colles, hence the name Colles fracture.

Other ways the distal radius can break include:

Intra-articular fracture: A fracture that extends into the wrist joint. (Articular means joint.)

Extra-articular fracture: A fracture that does not extend into the joint is called an extra-articular fracture.

Open fracture: When a fractured bone breaks the skin, it is called an open fracture. These types of fractures require immediate medical attention because of the risk for infection.

Comminuted fracture: When a bone is broken into more than two pieces, it is called a comminuted fracture.

It is important to classify the type of fracture because some fractures are more difficult to treat than others. Intra-articular fractures, open fractures, comminuted fractures, and displaced fractures are more difficult to treat, for example.

Sometimes, the other bone of the forearm (the ulna) is also broken. This is called a distal ulna fracture[1][11].

Cause

The most common cause of a distal radius fracture is a fall onto an outstretched arm.

Osteoporosis can make a relatively minor fall result in a broken wrist. Many distal radius fractures in people older than 60 years of age are caused by a fall from a standing position. A broken wrist can happen even in healthy bones, if the force of the trauma is severe enough[1][11].

Symptoms

A broken wrist usually causes immediate pain, tenderness, bruising and swelling. In many cases, the wrist hangs in an odd or bent way (deformity)

Complications of a bone fracture

1. Heals in the wrong position - this is known as a malunion either the fracture heals in the wrong position or it shifts (the fracture itself shifts).
2. Disruption of bone growth - if a childhood bone fracture affects both ends of bones, there is a risk that the normal development of that bone may be affected, raising the risk of a subsequent deformity.
3. Persistent bone or bone marrow infection - if there is a break in the skin, as may happen with a compound fracture, bacteria can get in and infect the bone or bone marrow, which can become a

persistent infection. Patients may need to be hospitalized and treated with antibiotics. Sometimes surgical drainage and curettage is required.

4. Bone death (avascular necrosis) - if the bone loses its essential supply of blood it may die[1][11].

Prevention of bone fractures

Nutrition and sunlight - the human body needs adequate supplies of calcium for healthy bones. Milk, cheese, yoghurt and dark green leafy vegetables are good sources of calcium.

Our body needs vitamin D to absorb calcium - exposure to sunlight, as well as eating eggs and oily fish are good ways of getting vitamin D.

Physical activity - the more weight-bearing exercises you do, the stronger and denser your bones will be. Examples include skipping, walking, running, and dancing - any exercise where the body pulls on the skeleton.

Older age not only results in weaker bones but often in less physical activity, which further increases the risk of even weaker bones. It is important for people of all ages to stay physically active.

The (female) menopause - estrogen, which regulates a woman's calcium, starts to drop and continues to do so until after the menopause, levels never come back up to pre-menopausal levels. In other words, calcium regulation is much more difficult after the menopause. Consequently, women need to be especially careful about the density and strength of their bones during and after the menopause.

The following steps may help reduce post-menopausal osteoporosis risk:

- Do several short weight-bearing exercise sessions each week
- Consume only moderate quantities of alcohol, or don't drink it
- Make sure you get adequate exposure to daylight Make sure your diet has plenty of calcium-rich foods. For those who find this difficult, talk to your doctor about taking calcium supplements[1][11].

4.2 *Kandabhagna*

In Ayurveda Bone fractures are classified into two types dislocation (*Sandhimukta*) and fracture (*Kandabhagna*). The types of fractures are:

1. *Karkataka:* Two ends of the shaft bent, swelling over the fracture in the middle
2. *Asvakarana:* Fractured ends in angular deformity.
3. *Curnita:* Fracture comminuted with crepitus.
4. *Piccita:* Fracture site crushed with several swelling.
5. *Asthichalita:* one fractured end displaced downwards and the other end sideways.
6. *Kandabhagna:* Fractured ends free & move on vibrating.

7. *Majjanugata:* One fractured end impacted into the marrow cavity of the other with exudation of marrow.
8. *Atipatita:*Fractured end droops(eg; jaw)
9. *Vakra:* Bone is bent, not completely fractured (greenstick)
10. *Chinna:* One surface fractured, the other surface of the bone intact.
11. *Patitam:* Large number of small penetrating wounds on the bone with severe pain.
12. *Sphutita:* Bone cracked, swollen and painful; feels as if it contains the bristles of aninsect[5][6][12].

4.3 **Treatment**

The three fundamental principles of fracture treatment are

i *Bhagna Sthapana* (Reduction)

ii *Bhagna Sthirikara* (Immobilisation)

iii *Punah cheshta prasara* (Rehabilitation)

As soon as the fracture is diagnosed steps should be taken to reduce the fracture. Delayed reduction may result in delayed union or non-union and the displaced fragment may cause nerve damage or disturbance of circulation. For reduction of a fracture, certain manipulations are necessary .Manipulation is usually done as a therapeutic measure. But when it is performed with skill and understanding, it acquires a diagnostic function in assessing the stability of a fracture which in turn may govern the choice of treatment. The aim of reduction is to reduce the space between fragments and to place in original position[5][6][7][12].

The correct repositioning of the displaced bone are achieved raising the depressed fragment, pressing down the elevated, pulling and straightening when one end is overlapping the other. The basic procedures in treating a fracture are traction (*ancana*) Compression (*Peedana*) immobilization (*Samkshepa*) and bandage (*bandha*) Once a joint or fracture is reset and the deformity corrected , it regains its normal state by healing which is facilitated by rest and cold irrigation, medicinal plaster and dressings with linen soaked in medicated oils and splints. During olden days splints were used for immobilization[5][6][8][12].

The barks of the following trees were found to be useful. .

Madhuca longifolia

Ficus glomerulata

Ficus religiosa

Butea frondosa

Terminalia arjuna

Bambusa bambos

Terminalia tomentosa

Ficus bengalensis

Bandages

Bandages are indispensable in the treatment of fractures. Bandages are usually done to hold the splints and dressings in position its main uses are

- to stop bleeding by pressure
- to give rest and support
- to retain dressings and splints in position
- to prevent edema
- to correct deformity

Types of bandages are

- Sheath (*kosa*) Around thumb and fingers
- Long roll (*dama*) Sling around straight parts of small width
- Cross – like (*svastika*) Spica around joints
- Spiral (*anuvellita*) Around upper and lower limbs
- Winding (*mutoli*) Circular around neck penis
- Ring (*mandala*) Circular around stumps
- Betel box type (*sthagika*) Amputation stumps tip of penis or fingers
- Two tailed (*yamaka*) Around limbs to treat ulcers
- Four-tailed (*khatva*) For jaw, cheeks, temples
- Ribbon-like (*cina*) Outer angles of eyes: temples
- Loosely knotted Over back abdomen & chest
- Noose like (*vibantha*)
- Canopy like Protective cover over head wound
- Cow horn (*gosphana*) Over chin, nose, lips, ano-rectal region
- Five tailed (*pancangi*) Head and neck above the level of clavicles

Acharyas have mentioned the rules of bandaging very scientifically. It should not be neither too tight nor too loose. Tightness can lead to swelling pain, blebs and too loose a bandage can never give the desired

stability of the fractured fragments. Like vise bandaging should be done in the interval of three, (hot Season) five (Normal season) or seven days (Cold season) depending upon the climatic conditions[5][6][9][12].

Immobilization techniques in Ayurveda

There are enough evidence to prove that Susrutha and his followers had profound knowledge on immobilization techniques. One of the application mentioned in Bhaishajya ratnavally is panka pradeha. It means application of mud around the fracture site. Most probably it could be analogous with plaster of paris which we practise today. Another type of immobilisation techniques which is very prevalent in Kerala and adjoining states are a combination of white of egg, Black gram powder and cloth[5][6][12]

Rehabilitation

The first objective of rehabilitation is to eliminate the physical disability to the greatest extend possible second to alleviate or to reduce the disability to maximum possible level and third to train the person with residual physical disability to work and live within the limits of disability but to the hilt of his capabilities Significance of the principles of rehabilitation was known to ayurvedic Acharyas. Susrutha has instructed the patient of fracture carpal bone to bear weight in increasing order as the fracture healing progress. He instruct the patient to bear the bolus of mud and then rock salt and later Pashana[5][6][12].

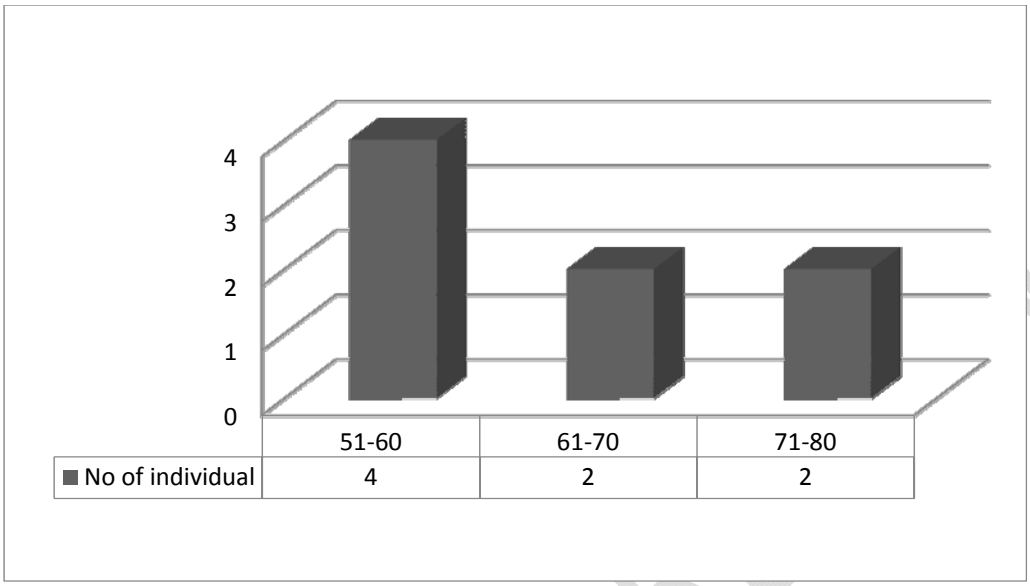
4.4 Prognosis

The treatment of curnita, chinna, atipatita and majjanugata type of fractures are difficult to heal. Dislocations of joints in children, elderly and debilitated individuals are also difficult to try

The treatment of fractures and joint injuries is difficult in patients who eat too little, who lack self – control to comply with instruction and those with vitaja constitution. The treatment is easy and successful in youth in the absence of dosa perturbation and in cold weather condition. The stability of a joint which takes a month in youth may require twice as long in middle age and thrice in old age[5][6].

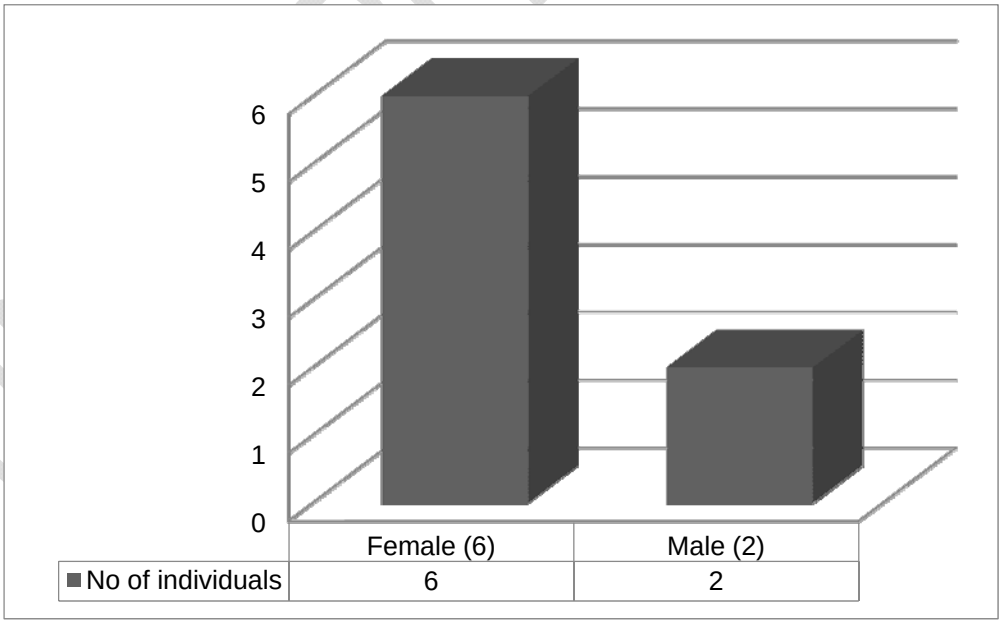
5. RESULT AND DISCUSSION

Fig 1 Details of wrist fracture patients' age



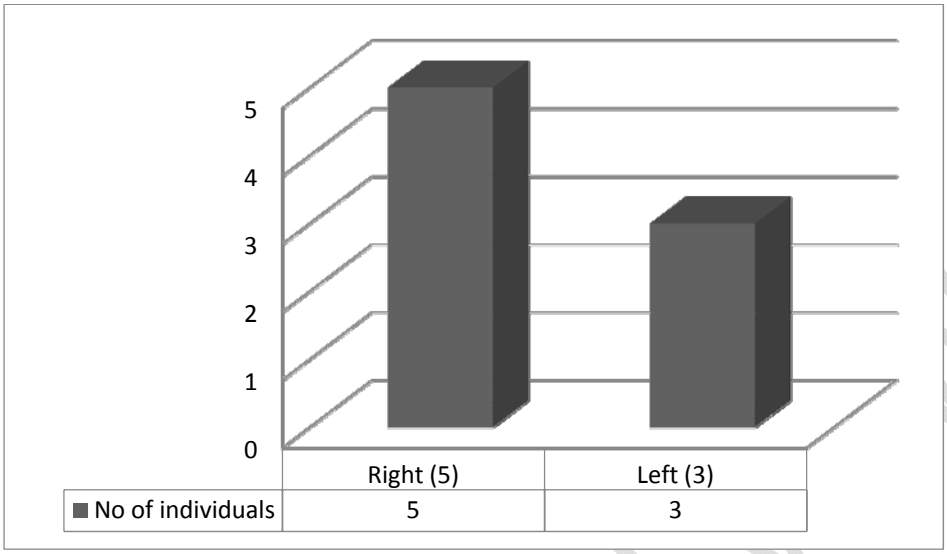
Out of 8 wrist fracture patients, 4 patients are in age of 51yrs to 60 yrs. 2 patients are in age of 61yrs to 70yrs and 2patients are in 71yrs to 80 yrs.

Fig 2: Details of wrist fracture patients' sex



Out of 8 wrist fracture patients, 6patients are female and 2 patients are male.

Fig 3 Details of fracture side



Out of 8 wrist fracture patients, 5 patients have right hand wrist fracture and 3 patients have left hand wrist fracture.

DATA CLASSIFIED WITH CATEGORY (MAXIMUM SCORE), 1ST DAY QOL SCORE, AFTER 6TH WEEK QOL SCORE, AFTER 3MONTH QOL SCORE, AFTER 6TH MONTH QOL SCORE AND P-VALUE.

Table 1 Group A (Analysis the quality of life to wrist fracture patients who took ayurvedic treatment straightly)

Category (Maximum score)	1st day	6th week	3month	*Probability value*
TotalIOFQOL score(**60**)	16	39	55	*P<0.05*
Pain	1	3	5	*P<0.05*
Numbness	5	5	5	*P<0.05*
Stiffness	1	3	4	*P<0.05*
Deformity	1	3	4	*P<0.05*
Wash or dry hair	1	3	5	*P<0.05*
Turn a door	1	3	4	*P<0.05*
Problems with doing works	1	3	4	*P<0.05*
Writing	1	3	5	*P<0.05*
Transport	1	3	5	*P<0.05*
Activities	1	3	4	*P<0.05*
Need help	1	4	5	*P<0.05*
QOL	1	3	5	*P<0.05*

Total maximum QOL score is 110, 1st Day QOL score is 16, after 6th week QOL score is 39 and after 3month QOL score is 55. Therefore improvement is significant.

Table 2Group B (Analysis the quality of life to wrist fracture patients who took ayurvedic treatment after getting western treatment)

a. Analysis the QOL in two patients who were got treatment for 6th weeks

	1st day	6th week	*Probability value*
Total IOFQOL score(**60**)	18	38.5	*P<0.05*
Pain	1.5	3.5	*P<0.05*
Numbness	3	4	*P<0.05*
Stiffness	1	3	*P<0.05*
Deformity	2	3.5	*P<0.05*
Wash	1	3	*P<0.05*
Turn a door	1.5	3.5	*P<0.05*
Doing works	1.5	3	*P<0.05*
Writing	2	3	*P<0.05*
Transport	1.5	3	*P<0.05*
Activities	1	3	*P<0.05*
Need help	1	3	*P<0.05*
QOL	1	3	*P<0.05*

Total maximum QOL score is 60, In 1st Day QOL score is 18 and after 6th week QOL score is 38.5. Therefore improvement is significant.

b. Analysis the QOL in one patient who were got treatment for 6month

	1st day	6th week	3month	6month	*Probability value*
Total IOFQOL score(**60**)	17	26	35	43	*P<0.05*
Pain	1	2	3	4	*P<0.05*
Numbness	5	5	5	5	*P<0.05*
Stiffness	1	1	2	3	*P<0.05*
Deformity	2	2	3	3	*P<0.05*
Wash	1	2	2	3	*P<0.05*
Turn a door	1	2	2	3	*P<0.05*
Doing works	1	2	3	4	*P<0.05*
Writing	1	2	3	3	*P<0.05*
Transport	1	2	3	3	*P<0.05*
Activities	1	2	3	4	*P<0.05*
Need help	1	2	3	4	*P<0.05*
QOL	1	2	3	4	*P<0.05*

Total maximum QOL score is 60, In 1st Day QOL score is 17, after 6th week QOL score is 26, after 3month QOL score is 35 and after 6 months QOL score is 43. Therefore improvement is significant.

Table 3 Group C (Analysis the quality of life to wrist fracture patients who took ayurvedic treatment after getting alternative treatment)

a. Analysis the QOL in two patient who were got treatment for 6month

	1st day	6th week	3month	6month	*Probability value*
Total IOFQOL score(**60**)	17	24	35	41	*P<0.05*
Pain	1.5	2.5	3.5	4	*P<0.05*
Numbness	5	5	5	5	*P<0.05*
Stiffness	1.5	2.5	3.5	4	*P<0.05*
Deformity	1	2	3	3.5	*P<0.05*
Wash	1	1.5	2.5	3.5	*P<0.05*
Turn a door	1	1.5	2.5	3	*P<0.05*
Doing works	1	1.5	2.5	3	*P<0.05*
Writing	1	1.5	2.5	3	*P<0.05*
Transport	1	1.5	2.5	3	*P<0.05*
Activities	1	1.5	2.5	3	*P<0.05*
Need help	1	1.5	2.5	3	*P<0.05*
QOL	1	1.5	2.5	3	*P<0.05*

Total maximum QOL score is 60, 1st Day QOL score is 17, after 6th week QOL score is 24, after 3month QOL score is 35 and after 6th month QOL score is 41. Therefore improvement is significant.

b. Analysis the QOL in two patient who were got treatment for 3month

	1st day	6th week	3month	*Probability value*
Total IOFQOL score(**60**)	21	31.5	42.5	*P<0.05*
Pain	2	2.5	3.5	*P<0.05*
Numbness	5	5	4.5	*P<0.05*
Stiffness	1.5	2	3	*P<0.05*
Deformity	2.5	3	4	*P<0.05*
Wash	1.5	3	4	*P<0.05*
Turn a door	1.5	2.5	3.5	*P<0.05*
Doing works	1.5	2.5	3.5	*P<0.05*
Writing	1.5	2.5	3.5	*P<0.05*
Transport	1	2	3	*P<0.05*
Activities	1	2	3	*P<0.05*
Need help	1	2	3.5	*P<0.05*
QOL	1	2.5	3.5	*P<0.05*

Total maximum QOL score is 60, 1st Day QOL score is 21, after 6th week QOL score is 31.5, and after 3month QOL score is 42.5. Therefore improvement is significant.

6. CONCLUSION

According to the result,

1st day, 6th week, 3 months and 6 months QOL score change from

- Group A: Total maximum QOL score is 110, 1st Day QOL score is 16, after the 6th week QOL score is 39 and after 3month QOL score is 55.
- Group B
  a. Analysis the QOL in two patient who were getting treatment for the 6th weeks
     Total maximum QOL score is 60, In 1st Day QOL score is 18 and after 6th week QOL score is 38.5.
  b. Analysis of the QOL in one patient who was getting treatment for 6months
     Total maximum QOL score is 60, In 1st Day QOL score is 17, after 6th week QOL score is 26, after 3month QOL score is 35 and after 6 months QOL score is 43.
- Group C
  a. Analysisof the QOL in two patients who were getting treatment for 3months
     Total maximum QOL score is 60, 1st Day QOL score is 21, after 6th week QOL score is 31.5, and after 3month QOL score is 42.5.
  b. Analysisof the QOL in two patients who were getting treatment for 6months
     Total maximum QOL score is 60, 1st Day QOL score is 17, after 6th week QOL score is 24, after 3month QOL score is 35 and after 6th month QOL score is 41.

- In group A, Patients who were directly visited to Ayurvedic treatment in BMARI at Orthopedic clinic they were getting quick improvement seen within 3months.

- In group B, Patients who were visited to Ayurveda treatment in BMARI at Orthopedic clinic after getting the western treatment, QOL in two patients who were getting treatment for 6th weeks QOL change from 18→ 38.5. QOL in one patient who were getting treatment for 6 month QOL change from 17→ 26 → 35→43.

In group C, Patients who were visited to Ayurveda treatment in BMARI at Orthopedic clinic after getting the alternative treatment, QOL in two patients who were getting treatment for 3month QOL change from 21→31.5→42.5. QOL in one patient who were getting treatment for 6 month QOL change from 17→24→35→ 41.

According to the above results, patients improvement can be clearly observed in Group A, B & C.

Acknowledgment

I acknowledge thanks to all persons who have helped me directly and indirectly with apology for my inability to identify them individually.

Ethical Approval:

This research is conducted in my Internship period at Bandaranayaks Memorial Ayurvedic Research Institute (BMARI). BMARI is a research institute so I didn't get the ethical clearance.

7. Suggestions

According to results and patients, satisfaction in Ayurveda treatment of fracture management is very effective. We should give awareness about, the effectiveness of Ayurveda fracture healing and management to public.

Suggested to analyzed number of individuals will increase we can get better results.

REFERENCES

1. John Crawford Adams., David Ha blen, Outline of fractures including joint injuries
2. Dr. Hemant D. Toshikhane., Dr. H.J. Sangeeta., Fracture Management in Traditional Indian Medicine
   Available:
   http://www.akamaiuniversity.us/PJST10_1_342.pdf
3. https://en.m.wikipedia.org/wiki/Quality_of_life
4. P. Lips & K. Jameson & M. L. Bianchi & S. Goemaere & S. Boonen & J. Reeve & J. Stepan & O.Johnell & N. M. van Schoor & E. Dennison & J. A. Kanis & C. Cooper & Working Group for Quality of Life of the International Osteoporosis Foundation, "Validation of the IOF quality of life questionnaire for patients with wrist fracture"
   Available:
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2788146/
5. Kaviraj kunja lal bhishagratna., sushruta
6. Ambhikadatta sastri, Susurutha Samhita; 1966
7. Vagbhta, Astanga Hrudaya
8. Atrideva kaviraj, Astanga Hridayam; 1962
9. Ambhikadatta sastri, Bhagna Chikitsa – A chapter in treatise Sushruta samhita
10. Charaka samkita, Gulabkunverba Ayurveda society publication, Jamnagar, India; 1949
11. John Crawford Adams., David Ha blen, Outline of fractures including joint injuries
12. Durkworth, T., Lecture Notes on Kadum bidums & fractures; 1980.
13. http://www.capture-the-fracture.org/fracture-epidemiology
14. https://en.wikipedia.org/wiki/Quality_of_life
15. Arunachalam, S., Treatis on ayurveda

Appendix

Serial No:
OPD ticket No:

Analysis the improvement of the quality of life in Ayurvedic treatment for the wrist fracture

1. Patient's general data
   - i. Name:
   - ii. Age:
   - iii. Sex:
   - iv. Permanent address:
   - v. Religion:
   - vi. Civil status:
   - vii. Occupation:

2. History of fracture
   - i. Date of fracture:
   - ii. Type of fracture:
   - iii. Fracture side:
     (Dominant/ non dominant)
   - iv. Wound: (Present/ Absent)
   - v. Any other history

3. General data

   Height:

   Weight:

   BMI:

4. Do you still have pain in the fractured forearm or hand?

	1st visit	6 weeks	3 months	6months
i. Not at all				
ii. A little				
iii. Moderately				
iv. quite a lot				
v. very much				

5. Do you have numbness or "pins and needles" in the fractured forearm or hand?

	1st visit	6 weeks	3 months	6months
i. Not at all				
ii. A little				
iii. Moderately				
iv. quite a lot				
v. very much				

6. Do you have stiffness in the fractured forearm or hand?

	1st visit	6 weeks	3 months	6months
i. Not at all				
ii. A little				
iii. Moderately				
iv. quite a lot				
v. very much				

7. Are you disturbed by the deformity of your fractured forearm?

	1st visit	6 weeks	3 months	6months
i. Not at all				
ii. A little				
iii. Moderately				
iv. quite a lot				
v. very much				

8. Can you wash or blow dry your hair?

	1st visit	6 weeks	3 months	6months
i. Without difficulty				
ii. With a little difficulty				
iii. With moderate difficulty				
iv. With great difficulty				

v.	impossible				

9. Can you turn a door key or unscrew the lid of a jar?

		1st visit	6 weeks	3 months	6months
i.	Without difficulty				
ii.	With a little difficulty				
iii.	With moderate difficulty				
iv.	With great difficulty				
v.	impossible				

9. Do you have problems with doing your work or homework?

		1st visit	6 weeks	3 months	6months
i.	No difficulty				
ii.	a little difficulty				
iii.	moderate difficulty				
iv.	may need some help				
v.	impossible				

10. Do you have problems with typing or writing?

		1st visit	6 weeks	3 months	6months
i.	No difficulty				
ii.	a little difficulty				
iii.	moderate difficulty				
iv.	great difficulty				
v.	impossible				

11. Can you use private transport e.g. drive a car or use a bicycle?

		1st visit	6 weeks	3 months	6months
i.	No difficulty				
ii.	a little difficulty				
iii.	moderate difficulty				
iv.	great difficulty				
v.	impossible				

12. To what extent has your fractured forearm interfered with your activities during the last week?

		1st visit	6 weeks	3 months	6months
i.	Not at all				
ii.	A little				
iii.	Moderately				
iv.	quite a lot				
v.	very much				

13. Do you need help from your friends or relatives because of your forearm fracture?

		1st visit	6 weeks	3 months	6months
i.	Never				
ii.	1day per week or less				
iii.	2-3days per week				
iv.	4-6days per week				
v.	Every day				

14. Would you say that your quality of life has declined during the last three months because of your forearm fracture?

		1st visit	6 weeks	3 months	6months
i.	Not at all				
ii.	A little				
iii.	Moderately				
iv.	quite a lot				
v.	very much				

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X ray of wrist fracture patient