

EVALUATION OF CLINICAL EFFICACY OF CISSUS QUADRANGULARIS IN PAIN MANAGEMENT AND BONE HEALING AFTER IMPLANT PLACEMENT – A PILOT STUDY

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Abstract:

Background: The ancient ayurveda science of medicine describes various herbal preparations that achieve the hastening of bone healing and relieve from pain and swelling. **Aim:** To evaluate the clinical efficacy of cissus quadrangularis in pain management and bone healing after implant placement. **Objectives:** To evaluate the clinical and bio chemical parameters using cissus quadrangularis after implant placement in terms of measurements of pain, swelling, serum alkaline phosphatase level and bone density around implant. **Type of Study:** Prospective Randomized Control Study. **Materials and Methods:** Patients were divided in two groups. Study group and Control group. Three patients in each group received implants either single implants or multiple implants. Study group was given cissus quadrangularis without any additional medicine and control group was given routine antibiotics (Amoxicillin 500mg and diclofenac sodium). Pain was assessed using VAS at 3rd, 5th day and after one week, swelling was checked in form of mild, moderate and severe, and serum alkaline phosphatase was recorded pre-operatively and 4th and 8th week of post-operative to evaluate bone healing. Patients' Orthopantomogram were subjected to densitometric analysis for evaluating the changes in the bone density in both the study and control group. **Results:** Pain and swelling were minimal and bone healing was more in study group and less in control group. There was an increase in serum alkaline phosphatase level at different follow ups in study groups when compared to control group. Densitometric analysis showed significant improvement in bone density around implant in study group when compared to control group. **Conclusion:** Use of cissus quadrangularis after implant placement showed significant effect on pain and swelling management. Also rising level of serum alkaline phosphatase and good bone density when compared to control group indicated new bone formation thus helps in osteointegration.

Key Words: Cissus Quadrangularis, Implants, osteointegration, pain, swelling, serum alkaline phosphatase.

Introduction-

Cissus quadrangularis is an indigenous medicinal plant seen in India. The plant is known as “Har-sankar” in Hindi and “Asthisanghara” in Sanskrit. In old practice the use of this plant was to promote fracture healing process. The plant contains a high amount of Vitamin C, carotene A, anabolic steroidal substance and calcium¹.

Cissus quadrangularis, a perennial climber widely used in traditional medicinal systems of India has been reported to possess bone fracture healing, antibacterial, antifungal, antioxidant, antihelminthic, antihemorrhoidal and analgesic activities. This plant has been recognized as a rich source of carotenoids and ascorbic acid and is proved to have potential for medical effects, including “Gastro protective activity” in conjugation with NSAID therapy and in “Lipid metabolism and oxidative stress”⁶.

As *cissus quadrangularis* is rich in Vitamin C, carotene A, anabolic steroidal substance, calcium and increase the osteoblastic activity to help in repair the fracture bones. It can be used in post implant insertion to accelerate the osteointegration.

Dental implants are inert, alloplastic materials embedded in the maxilla and/or mandible for the management of tooth loss and to aid replacement of lost orofacial structures. The implants have become an important therapeutic modality in the last decade, mainly after the works developed by Brånemark (1960s), in which the direct contact between the bone functional tissues and the biomaterial titanium was termed osseointegration.²

Implant Stability and Success mainly depends on osteointegration. The great majority of clinicians and patients are interested in shortening the treatment time between tooth extraction and implant placement. So, the present study aimed to evaluate the clinical efficacy of *cissus*

quadrangularis in pain management and bone healing after implant placement and reduction in osteointegration period.

Materials and Methods

In this study 6 patients were selected in whom implant placement was planned to replace the missing teeth. The study was done at Department of Oral & Maxillofacial Surgery, Narsinhbhai Patel Dental College and Hospital, visnagar, Gujarat. All patients underwent an adequate pre-surgical preparation consisting of detailed case history, consenting of patient, blood investigations and radiographic examination. All patients met an inclusion and exclusion criteria. Inclusion criteria was patient with missing teeth and want replacement with fixed prosthesis, Patient willing to participate in the study and come for follow up and age group 18-55 years. Exclusion criteria were medically compromised patients, patients not willing for the procedure and patients taking drugs that affect bone metabolism.

The patients were divided into two groups (three patients in each group). Group 1 (Study Group) was given capsules of *Cissus Quadrangularis* (500mg/day) two capsules B.D. for 50 days post-surgery and Group 2 (Control Group) was given regular antibiotics and analgesics regimen. Antibiotic given was amoxicillin and clavulanic acid 625mg and analgesic diclofenac sodium.

Following the standard surgical protocol, under local anaesthesia (Lignox 2%) the implant placement was carried out. Serum alkaline phosphatase was assessed preoperatively to set up baseline values. Results were assessed on the basis of the following parameters:

Pain, swelling, and serum alkaline phosphatase levels. Bone density analysis by densitometry

Pain was assessed using visual analogue scale at the 3rd day, 5th day and after one week. Swelling was checked in form of mild, moderate and severe.

Type of Study

Prospective randomized control study

Statistical Analysis

All the collected data were subjected to statistical analysis using SPSS-17 software. Statistical analysis was done by using pair Z test.

Results

Total 6 patients included in study. Three patients in each group. 1. Control Group and 2. Study Group. They all met inclusion criteria and attended follow up. All patients were male and mean age was 37.16. Total 18

implants were placed in six patients which was single implants to multiple implants. EQUINOX myriad implant system was used and all implants were placed under standard surgical protocol under local anesthesia. Control group was given routine antibiotics and analgesics post-operative for one week and study group was given Cissus Quadraangularis 250 mg /BD for 50 days. Serum alkaline phosphates value was recorded pre-operative to set baseline value and post-operative it was recorded at 4th and 8th week. Follow up for pain and swelling was done at 3rd day, 5th day and at end of 1st week. Pain was assessed in visual analogue scale (fig.1) and it is shown in table 1

VAS Score		1	2	3	4	5	6	7
Control	3 day	0	0	0	0	2	1	0
	5 day	0	0	1	1	0	0	1
	7 day	0	2	1	0	0	0	0
Study	3 day	0	0	2	1	0	0	0
	5 day	2	0	1	0	0	0	0
	7 day	3	0	0	0	0	0	0

Table 1: Number of patients reporting the nature of Pain by VAS post operatively

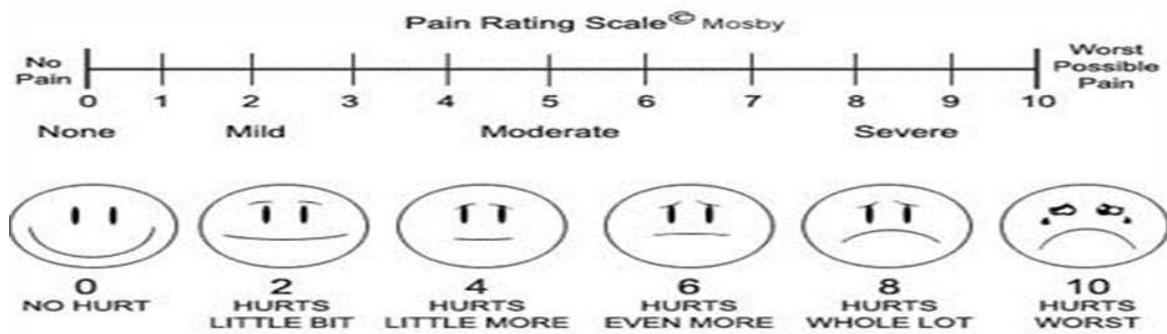


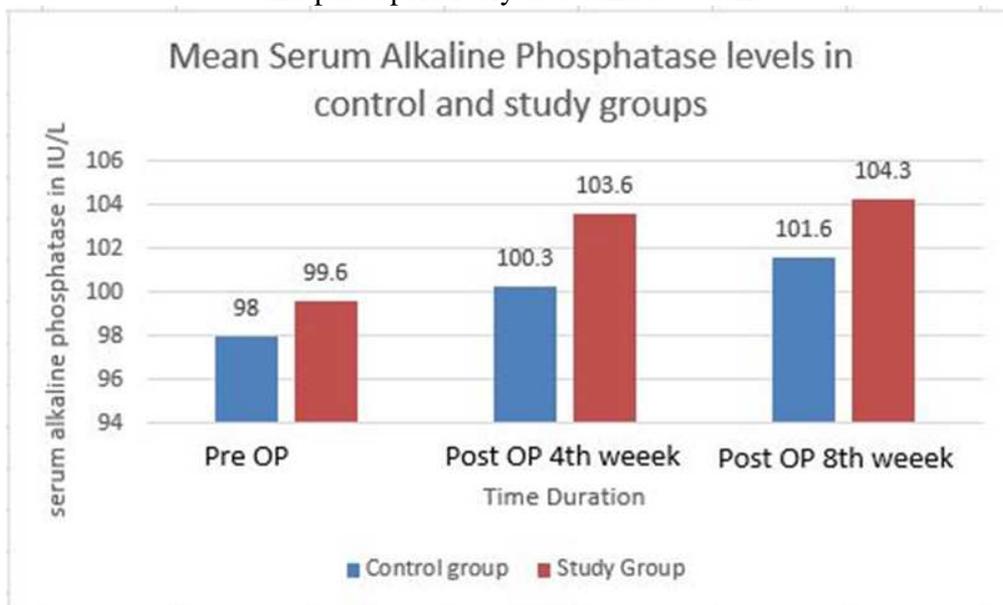
Figure 1 – Visual analogue scale for assessment of pain

		Mild	Moderate	Severe
Control	3 day	2	1	0
	5 day	1	2	0
	7 day	3	0	0
Study	3 day	2	1	0
	5 day	2	1	0

	7 day	3	0	0
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Table 2: Number of patients reporting the nature of swelling post operatively.

Following graph shows mean serum alkaline phosphatase values in both groups pre-operatively and post operatively at 4th and 8th week.



Graph 1: Mean Serum Alkaline Phosphatase levels in control and study groups

Mean Serum alkaline phosphatase values show significant value (Table 3). Group 2 study group proved to be better group who received cissus quadraangularis and these

patient received prosthesis early than usual integration period, resulted in patients and clinicians satisfaction.

Parameters	Pre-operative	4 th week post op	8 th week post op
control	98	100.3	101.6
study	99.6	103.6	104.3
P value	0.08	0.006	0.001
significance	Non-significant	Highly significant	Highly significant

Table 3: Mean AlkPo4 levels and their comparison in control and study group.

OPG of study group and control group were subjected for densitometric analysis. (KODAK IMAGING Software) which has

shown significant value in study group. (Table 4 (a) (b).)

Comparison (Study Group)	Mean	Standard Deviation	P Value
Pre op	143.33	11.150	.107
45 days	152.33	16.258	
45 days	152.33	16.258	.024
90 days	163.00	14.177	

Pre op	143.33	11.150	.008
90 days	163.00	14.177	

Table 4 (A): Densitometry analysis for Study group

Comparison Control group	Mean	Standard Deviation	P Value
Pre op	124.0	5.29	.120
45 days	128.0	3.60	
45 days	128.0	3.60	.020
90 days	130.3	3.21	
Pre op	124.0	5.29	.049
90 days	130.3	3.21	

Table 4 (B): Densitometry analysis for Control Group**Discussion**

Dental implant is an alloplastic material that is surgically inserted into hard and soft tissue which bears a superstructure for esthetics and function purposes. After loss of teeth, loss of bone occurs both in width and height resulting into various esthetic and functional complications.

The ancient ayurveda medicinal science describes various herbal preparations that achieve the hastening of bone healing. The names of the plants in ayurveda have been given based on their medicinal properties. The plant is known as Harshankar in Hindi and Asthisanghara in Sanskrit. Harjor means that which joins the bones.³

Bone is a dynamic organ that undergoes lifelong changes by bone remodeling using specialized cells and is the predominant process after attaining peak bone mass around the third decade. Remodeling is an essential process for maintaining the skeleton by repairing any damaged portions and removal of old bone as well as for discharging calcium and phosphorus from bone stores to maintain ionic homeostasis in the body.⁷

Different cultures around the world have used herbs for thousands of years to treat several health conditions. One of the herbs

that have shown beneficial effects on bone belongs to the *Cissus* family of plants. *Cissus quadrangularis* (CQ) is a medicinal herb used in Siddha and Ayurveda medicine since ancient times in Asia, as a general tonic and analgesic, especially for bone fracture healing.

Cissus quadrangularis contains vitamins and steroid which are found to have a specific effect on bonehealing. The anabolic steroidal principle from *Cissus quadrangularis* shows a marked influence on the rate of fracture healing by influencing early regeneration of all connective tissues involved in the healing and quicker mineralization of callus.

There was shortening of about two weeks in the duration of bone healing. The hastening in the bone healing was attributed to the stimulation of all cells of mesenchymal origin, namely, the fibroblasts, chondroblasts and osteoblasts, by *Cissus quadrangularis*. Thus *Cissus quadrangularis* builds up the chemical composition of the fractured bone namely mucopolysachrides, collagen calcium phosphorus and others as well as its functional efficiency.⁶

In human medicine, bone markers are commonly used for control of various therapeutic protocols and monitoring of cell

activity in bone metabolic diseases and other disorders related to bone changes. For assessing bone healing and bone formation serum alkaline phosphatase is one of the most important serum biomarker so checking ALP levels at regular intervals can help in clinically evaluating the bone healing progress. In this study we used chemical biomarker serum alkaline phosphatase (ALKPO4) to monitor bone healing after implant insertion. We measured levels of several serum biochemical markers to determine the influence of CQ on the state of bone turnover.

We used *Cissus quadrangularis* in tablet form. (HADJOD – Of Himalaya). In study group we gave *cissus quadraangularis* and it proved to be very beneficial. There was elevation in serum alkaline phosphatase in study group. We also subjected Orthopantomograms of the patients for densitometric analysis post-operatively which showed significant improvement in bone density in the patients who were given *cissus quadrangularis* post-operatively. Thus it has shortened the osteointegration period after implant placement. We delivered prosthesis earlier in study group.

D. K. Deka et al. (1994) conducted a study on eight healthy dogs to evaluate the efficacy of *Cissus quadrangularis* in accelerated bone healing in experimentally fractured radius and ulna. The results showed that at the end of 11th day radiographically bony dissolution and periosteal reaction was more in *Cissus* group than in control group. At the end of 11th day serum calcium levels were also significantly decreased in *Cissus* group showing increased uptake of calcium at the healing site. At the end of 21st day *Cissus* group showed significantly more bony deposition and periosteal reaction compared to control group radiographically.

In our study we took radiographs at regular interval of 1st, 4th and 6th week and it showed better osteointegration. As it was subjected for densitometric analysis using Kodak software. **(Table 4(a) (b))**

Vibha Singh et al. (2011) conducted a study on 44 fracture patients to check the efficacy for osteogenic potential of *Cissus quadrangularis*, *Moringa oleifera* and osteoseal. They checked serum calcium, total and ionic, phosphorous levels and took pre & post treatment radiographs at first, fourth and sixth week after trauma. The results showed that healing was the fastest in Osteoseal group followed by *Cissus* group. They concluded that *Cissus quadrangularis* has vitamins and anabolic steroids which have marked influence on bone healing. The bone healing period was shortened by two weeks in *Cissus* group.

R. Sinha et al. (2011) conducted a study on 36 fracture patients to evaluate role of common biomechanical markers for the assessment of bony union. They measured the levels of serum alkaline phosphatase, urinary hydroxyproline and took x-rays 3rd, 5th, 8th and 12th week postoperatively. The results showed that there is statistically significant difference of serum ALP levels and urinary hydroxyproline levels between normal union and mal union groups. Serum ALP levels were significantly increased in patients in whom normal bone healing occurred and it also increased slightly in patients in whom malunion of the bony fragments occurred. Thus they concluded that serial monitoring of biochemical markers like serum ALP levels reflects the actual status of bone resorption and bone formation over a short time frame. A statistically significant positive correlation between serum ALP levels indicates progress towards satisfactory bone healing. Thus, we considered serum ALP levels for evaluating bone healing after *cissus*

administration along with densitometric evaluation which suggested good bone healing post-operatively in cissus group then control group.

Conclusion

We conclude that CQ can reduce bone loss. CQ probably reduces bone resorption primarily by downregulating proinflammatory cytokines. The beneficial effects of CQ are probably due to the flavonoids present. CQ being an edible plant and with a history of medicinal effects, especially in healing bone fractures, may be a good supplement for accelerating the bone healing after implant placement. So, we recommend its use after dental implant placement to minimize the osteointegration period.

Conflict of interest: Non Declared

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