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Integrative approach to fracture healing: A review

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Abstract

It is said that first sign of civilization in human history was a femur that had been broken and then healed with the care of the loved ones. Such deep is the association of mankind and fractures. Since time immemorial, fracture patients are taking varied therapies to enhance fracture healing. Some are evidence based, some are not. With renewed interest in complementary and alternative medicine; it becomes wise to make primary care physicians aware of the viewpoints of dietician, homeopathy doctor and an ayurveda doctor on the medicines prescribed by them for fracture cases. A physician should be aware of different treatment methodologies to have an intelligent discussion with a curious patient. Dieticians emphasize on a healthy balanced diet. Ayurveda physicians focus on shali rice and clarified butter; while homeopathy physicians vouch on Symphytum.

Key words: fracture healing, alternative remedies, integrative approach, diet, ayurveda, homeopathy

Introduction

We are witnessing increasing number of fractures with patient's wish to be mobile "as soon as possible". Access to Google, grazing of often contradictory literature and the lickety-split attitude to be functional often led to consultation with practitioners of different therapies.

A medical doctor is often faced with the query of best diet for fracture healing and she/ he often digs out history of Homeopathy/ Ayurveda medication intake with the purpose to enhance fracture healing. So, it's prudent that a primary care physician be aware of the diet that is good for bone health and be aware of the medicines that are prescribed by Homeopathic and Ayurveda doctors for fracture cases.

Fracture healing is a complex process and different mechanisms come into picture while treating a fracture operatively or non-operatively. Diet or any medication cannot be a substitute for an evidence based management of a fracture.

This review has summarized the opinion of a dietician, an Ayurveda doctor, a Homeopathy doctor and opinion of an allopathic physician on routine medications prescribed to ensure timely fracture healing. A physician should be aware of different treatment methodologies to have an intelligent discussion with a curious patient [1].

Role of diet in fracture healing:

A well-planned diet will help a patient build strong bones that are so essential for fracture healing. A patient needs sufficient calcium for bones in the reparative phase and adequate vitamin D for absorption of calcium in the body.

In general, a dietician would advise the following for a patient with a fracture:

1. Eat Lots of Vegetables

Vegetables are rich in vitamin C, which eventually helps in the stimulation of bone-forming cell production. Moreover, the antioxidant effects of Vitamin C may help in protecting bone cell damage as suggested in some studies [2]. Increase in bone mineralization and maintenance of bone mass has been linked to a high intake of fresh seasonal green and yellow vegetables.

2. Consumption of Adequate Protein

For the healing of the fracture, adequate-protein is important. Collagen is the protein that is found in bone in significant percentage. Less intake of protein decreases the absorption of calcium, thereby affecting rates of formation of bones and its breakdown [3]. But, protein more than 100 grams on daily basis can lead to leaching of calcium from bones in response to rising acidity in the bloodstream. Nevertheless, it can be avoided as long as there is a balance of enough calcium intake along with

plenty of plant foods in the diet [4].

3. Daily consume calcium-rich foods

The most vital mineral for healthy bone is calcium, and it is the chief mineral present in bones. Daily consumption of calcium for the protection of the bone structure and its strength is important because of the continuous breakage of bones and their replacement with new ones. 1,000 mg per day is the Indian Recommended Daily Allowance (RDA) for Calcium [5].

Calcium's good sources are:

a) Milk, paneer, buttermilk, and other dairy products
b) Green leafy vegetables, like cabbage, broccoli
c) Soya beans
d) Tofu
e) Nuts
f) Bony part of fish, such as sardines

Though, the absorption of calcium in the body varies greatly. It is always good to include calcium in the diet throughout the day e.g. include one high-calcium food in every meal from the above list.

4. Take enough amount of Vitamin D and Vitamin K

Fat-soluble vitamins like Vitamin D and vitamin K are enormously important for the healing of fractures. Vitamin D has many roles in bone health which includes absorption of calcium. We may be deficient in Vitamin D, as it is not easy to get it from our diet and by the action of the sun exposure (without sunscreen on our skin). Good dietary sources of Vitamin D are:

a) Food products like milk and oils fortified with Vitamin D
b) Eggs
c) Salmon, sardines and mackerel type oily fish

Vitamin K2 alters osteocalcin, which is a protein involved in bone formation. This alteration aids osteocalcin to fix minerals in bones which helps in prevention of the calcium loss from bones [6]. MK-4 and MK-7 are the most common forms of Vitamin K2. MK-4 is found in liver, eggs, and meat in small amounts. MK-7 exists in fermented foods like cheese and fermented soybean products.

5. Avoid Very Low-Calorie Diets

Following a low-calorie fad diet is not a good idea or an achievement, particularly for fracture healing. It slows down metabolism, creates rebound hunger, causes loss of muscle mass and it can damage bone health. Strong bones are built and maintained by following at least 1,200 Kcal well-balanced diet every day. Bone health is supported by adequate protein and a diet rich in vitamins and minerals.

6. Consume foods rich in Omega-3 Fats

Anti-inflammatory effects are produced by omega-3 fatty acids in the diet. An adequate balance of omega-6 to omega-3 fats is equally important in addition to having omega-3 fatty acids in the diet. One should look forward to a 4:1 or lower ratio for an omega-6 to omega-3.

Food sources of omega-3 fats include fenugreek seeds, fenugreek leaves, soya beans, red beans, flaxseeds, nuts such as almonds, walnuts; seafood and other fishes (specifically cold-water fatty fish, like mackerel, sardines, tuna, salmon, and herring); plant oils like soybean oil, canola oil.

Omega-6 fatty acids are a kind of polyunsaturated fat that naturally occurs in vegetable oils, seeds, and nuts.

Role of Ayurveda therapy in fracture healing:

Various Ayurveda Formulation for Internal and External Administration-

1. Intake of Ghrit ksheer (Clarified butter and milk) along with drugs of Kakolyadi gana (herbal drugs of particular gana (group), Laksha (Lecca) and Ghrita (Clarified butter) for fracture patient [7].

2. Manjishtha (Indian Madder), Mulethi (Licorice), Red Sandal macerated with Shatdhaut Ghrita (100 times washed Clarified butter) and Shali Rice (a type of rice) should be applied over the fractured portion [8].

3. Sheetal kashaya (water decoction) made of Nyagrodadi gana or Dugdha Sadhita (heated with milk) with Laghupanchmoola should be used for external shower [9].

Ayurveda diet for a fracture patient-

Acharya Shushruta (an ancient sage) mentions that intelligent physician should advice the patient of fracture to take Shali rice, Meat soup, Milk, Clarified butter, Pea's soup and nourishing food and drinks. Patient should avoid use of Salt, Citrus, Pungent food, Alkali food, avoid indulgence in sexual activity, avoid strenuous work and dry foods [10].

Role of Homeopathy therapy in fracture healing

Homeopathy is a therapeutic system which was founded by a German physician Christian Friedrich Samuel Hahnemann (1755 – 1843). Homeopathy is considered a branch of medical science which is based on the principle that diseases can be cured by strengthening the defense system with the substances selected for their properties to develop similar kind of symptoms if given in crude form [11].

In day to day clinical practice, Homeopathy is widely used in the fracture-repair. Homeopathy helps by accelerating the healing of fractures and it enhances callus formation and reduces pain.

In 1992, H. Zeeden in 1992 presented 5 cases to demonstrate the benefit of Symphytum officinale in factures [12]. These cases included a delayed union case of a fracture of os naviculare, a fatigue fracture case and a case of post-traumatic pseudarthrosis of sternum. Similarly, in 2008 and in 2010, Sakakura and colleagues showed that Symphytum officinale enhances osseointegration and bone formation around the titanium implants of tibiae of rats [13, 14].

In 1994, Oberbaum et al. conducted a study on guinea pigs. Bone fractures were induced and then Arnica and Symphytum were administered. The study showed that there was significant increase in mineralization of new bone at the site of factures in homeopathically treated group in comparison to the group treated by placebo [15].

In a classical Homeopathic prescription, patient's physical as well as mental symptoms are taken into account. So, same medicine can be prescribed in different clinical conditions and different remedies can be given to apparently similar clinical pictures and different mental pictures of patients. However, it has been seen that there are certain medicines which works specifically in cases of fractures. Arnica, Calcarea Phos, Symphytum and Hypericum are such medicines which are used widely.

Arnica Montana can be given in the first days to reduce the swelling and pain at the fracture site. Calcarea Phos can be the choice of remedy if reunion and healing is delayed. Symphytum is widely used to enhance callus formation, to reduce pain and fasten the reunion. Hypericum is used in the nerve rich areas.

Calcium and vitamin D supplements for fracture healing:

It's an established concept that vitamin D has a role in fracture healing [16]; but, available data are too uneven to

illuminate how and in what manner [17, 18] Cholecalciferol (Vit D3) is the most frequently prescribed Vitamin D form. 1 μg of cholecalciferol is equivalent to 40 IU of vit D. It is usually given as 60,000 IU in 1 g granules every week for 3 months. Calcitriol 0.25μg orally on alternate days is the next frequent prescription of Vitamin D. But, hypercalcemia has to be watched for this drug [19].

Calcium supplements usually in the form of Calcium carbonate (40% Ca) 500 mg twice a day is prescribed for fracture patients. These supplements are usually well stomached; only gastrointestinal side effects like constipation, bloating and excess flatulence (especially with calcium carbonate) have been described. But, it has been reported that if diet is suitable these calcium supplements does not accelerate fracture healing [20].

Conclusion:

Overall, physicians (particularly of developing world- as these therapies are used more often in this part of the world) must be aware of these complementary and alternative medicine (CAM) for fracture healing [21]. A knowledge of these therapies will ensure a cognizant expression of physician in front of the patient. Knowledge of CAM would encourage physician to specifically ask patients about usage of these therapies and would ultimately lead to enhanced confidence of patient onto his/ her physician.

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