



Homeopathic *Arnica* to Control Orthodontic Pain: A Substitute to Conventional NSAIDs

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ABSTRACT

With pain being the major drawback and reason for patient dropouts in orthodontic treatment, its management becomes an essential part of orthodontics. Patients commonly use nonsteroidal anti-inflammatory drugs (NSAIDs) such as paracetamol, ibuprofen, Diclofenac-sodium, Acetylsalicylic acid, and Celecoxib to alleviate orthodontic pain. However, it has shown that the use of these drugs has a significant effect on the orthodontic movement of teeth.

Arnica montana is an accepted remedy in homeopathic medicine since concentrated extract of *Arnica* can be toxic, only homeopathic pellets which contain extremely diluted concentration of drug are considered appropriate for ingestion.

Arnica has shown efficiency in treating inflammation and associated pain. It has a wide scope in the field of dentistry and can be used as an alternative to NSAIDs in order to control intra-operative and post-operative pain without hampering orthodontic tooth movement. *Arnica* 30° C can be used for the treatment of dental pain.

Keywords: Homeopathic *Arnica*, NSAIDs, Orthodontics, Pain control, Tooth movement.

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INTRODUCTION

The experience of orthodontic pain is one of the significant disadvantages of orthodontic treatment.¹ The

incidence of pain is common in routine orthodontic treatments and is associated with procedures such as placement of the archwires or separators, including the follow-ups for activation of appliances.

The NSAIDs are commonly used for pain control.² However, the main disadvantage of NSAIDs is that it interferes with the inflammation process³ produced during the orthodontic movement of teeth.⁴

This allows one to explore other possibilities like the use of complementary therapies such as plant medicines, as a substitute. *Arnica* is one of the famous homeopathic remedies, used in the treatment of inflammation and associated pain.⁵ It is proposed that NSAIDs can be replaced with *Arnica montana* to counter orthodontic pain.⁶

DISCUSSION

Orthodontic Pain

Pain is an unpleasant feeling which may occur due to injury or illness.^{1,7} The incidence of pain is common in routine orthodontic treatments and is associated with procedures such as placement of the archwires or separators, including the follow-ups for activation of appliances.⁸ The pain associated with archwire placement is found to be more intense and long lasting than that associated with dental extraction.^{9,10} Also the pain produced by the fixed appliances is more than that caused by removable or functional devices.¹¹ When orthodontic forces are applied on the teeth it leads to inflammation of periodontal tissues and pulp, which release various biochemical mediators such as substance-P, histamines, enkephalins, serotonin, prostaglandins, and cytokines eliciting hyperalgesic response.¹² All of this results into the sensation of pain.¹³

Methods used to control Orthodontic Pain

The methods used to control orthodontic pain range from anesthetics, analgesics, low-intensity lasers to vibrations.¹¹ However, NSAIDs are more commonly used to alleviate orthodontic pain control. The most commonly used NSAIDs in dentistry are paracetamol, ibuprofen, diclofenac-sodium, acetylsalicylic acid, valdecoxib, and celecoxib.¹³

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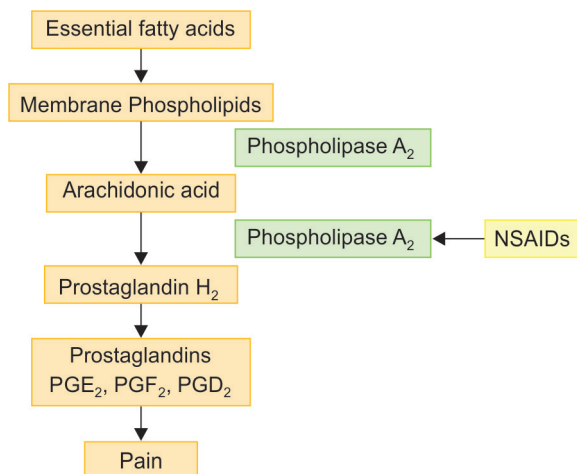


Fig. 1: Mechanism of action of NSAIDs

NSAIDs inhibiting cyclooxygenase enzyme in the pain pathway to inhibit the formation of prostaglandins hence, inhibiting pain

Mechanism of action of NSAIDs

The prostaglandins play an important role in inflammation and blood clotting and results into associated pain. The production of prostaglandins is initiated by the activity of cyclooxygenase enzymes. NSAIDs inhibit the cyclooxygenase enzymes thus relieves pain (Fig. 1).

Limitations of NSAIDs in Orthodontics

The biological mediators like prostaglandins play an important role in tooth movement during orthodontic treatment.^{3,4,14,15} However, NSAIDs inhibits the prostaglandin production thus hampers the orthodontic movement of teeth.^{3,4} To alleviate orthodontic pain without affecting the rate of tooth movement it becomes important to search for a new alternative to conventional NSAIDs.

Arnica: The use of plant remedies has rapidly expanded across the globe. *Arnica* extract can be obtained from the plant species of the Asteraceae family which including *Arnica montana*, *Arnica fulgens*, *Arnica chamissonis*, *Arnica sororia* and *Arnica cordifolia*. *Arnica* commonly used in complementary medicine is available as gels, creams, ointments for topical application as well as tablets for systemic administration¹⁶ (Fig. 2).

Preparation of homeopathic *Arnica*. In homeopathy, remedies are prepared by diluting the original substance at a specific ratio for a certain number of times. The centesimal, i.e., 'c' potency is one in 100, i.e., 1:100 ratio. The digit appearing before the potency letter denotes the amount of dilution. Therefore in the concentration of 30° C, *Arnica* extract is diluted 30 times. *Arnica* 30° C can be used for the treatment of dental pain.⁵

Mechanism of action of *Arnica Montana*: *Arnica* has been successfully used in reducing the pain experience after tooth removal. *Arnica* acts locally on the muscles, joints



Fig. 2: *Arnica Montana* flower- head from which the *Arnica* extract is obtained

and on the blood vessels, thus reducing pain, swelling and discomfort.

The oral administration of *Arnica* in homeopathy has proved to be effective in alleviating intra-operative and post-operative pain, discomfort and swelling. Also, a combination with topical application of *Arnica* gel shows improved efficiency. Ibuprofen can be replaced with topical *Arnica* which shows anti-inflammatory action owing to the presence of Helenalin and Sesquiterpenes.⁶

It has been shown that the most active component of *Arnica* is Helenalin. It modifies and balances the nuclear factor kappa B (NF-kB)/inhibitor of kappa B (IkappaB) complex in the lymphocytes and epithelial cells.¹⁷ *Arnica* is also known to obstruct the transcriptional factor NF-kB thus, imparting anti-inflammatory action.

NF-kB mobilization has been found to be associated with pain and inflammation. Inflammatory pain can be distinguished by the release of pro-inflammatory cytokines namely Tumor Necrosis Factor-Alpha (TNF-a) and Interleukin-1beta (IL-1b). Helenalin inhibits the T cell-specific surface glycoprotein's thus preventing the activation of T cells.¹⁸ It also inhibits enzymes Leukotriene C4 Synthase and 5-Lipoxygenase which are responsible for the production of Leukotriene. Sesquiterpene is known to inhibit pro-inflammatory cytokines namely Tumor Necrosis Factor-Alpha and Interleukin-1beta.¹⁹ Additionally, *Arnica* also decreases the levels of inducible nitric oxide synthase, cyclooxygenase-2 protein, and nitric oxide production²⁰ (Fig. 3).

Clinical Studies

A retrospective questionnaire-based study was conducted by Miyawaki et al.,²¹ on 111 adult patients to examine discomfort caused by lingual bonded orthodontics, 57 to 76% of patients complained of teeth pain and found trouble in maintaining oral hygiene post-

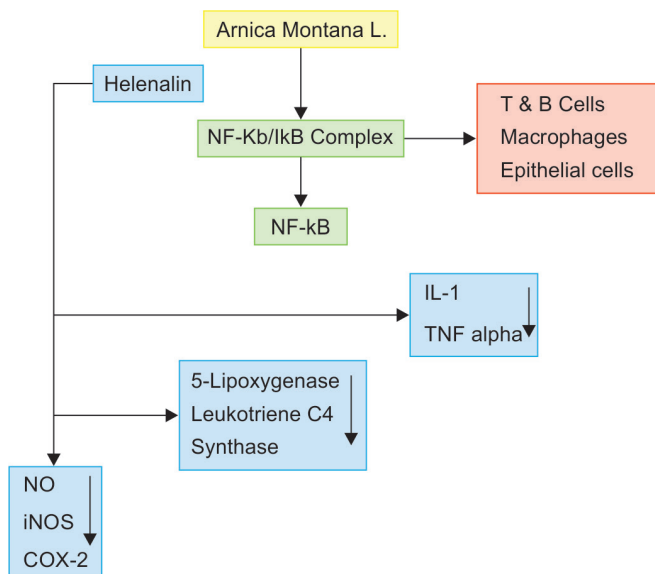


Fig. 3. Mechanism of action of Arnica

bonding of the lingual appliance. *Arnica montana* D6 was successfully used to reduce pain and swelling.²¹

Dr K. Peck²² believes that *Arnica* in a 30 CH potency is very effective in alleviating pain. She also suggested combining *Arnica* and *Hypericum* to alleviate orthodontic discomfort and administering the first dose within 10 minutes before the insertion of separators, while the remedy should be administered three to four times daily.

A retrospective study including 437 patients in whom a total of 736 implants were placed was conducted by Mazocchi²³ in 2007. In this study *Arnica montana* 5C was used as an anti-inflammatory agent three times daily for three consecutive days postoperatively. Healing was evaluated during second stage surgery. The study shows the effective anti-inflammatory action of *Arnica montana* with 96.2% success rate of the implants.

A study was conducted by Mazzocchi²⁴ on 20 patients, aged between 13 to 17 years undergoing surgical exposure of canines. Patients were given *Arnica montana* in homeopathic dilution of 30C along with *China Rubra* and *Hypericum perforatum* in the concentration of 15 CH and 7 CH respectively. Follow up was done on the second day and seventh day. The moderate swelling was seen in two patients on the second day but was absent on the seventh day. All the 20 patients did not show any sign of pain during follow up visits post surgery.

A study was carried on 30 patients of age group 16 to 26 years, with impacted 3rd molars by Ramos.²⁵ A random distribution of subjects was carried out in two categories, the homeopathic complex, and placebo respectively and extraction of impacted 3rd molars was carried out. Each patient received granules in the form of nine powders. The homeopathic complex consisted of *Arnica montana* in the 30th centesimal potency, *Hypericum perforatum*

in the 200th centesimal potency and Phosphorus in the 30th centesimal potency. The placebo-medication consisted of *Saccharum lactis*. One dose was equivalent to one powder. Patients were instructed to take powder number one the evening prior to the extraction; powder number two the morning of extraction; powder number three as soon as the surgical procedure was completed; powder number four before going to bed on the day of the surgery; Thereafter, the patient took one powder daily in the morning on rising for the following five days. The results showed that the homeopathic complex consisting of *Arnica montana*, *Hypericum perforatum* and phosphorus is effective in minimizing pain and associated complications with 3rd molar extraction.

CONCLUSION

The NSAIDs most commonly used as a pain control measure in orthodontic treatment which tends to hamper the tooth movement.²⁶ Thus, the need for an effective alternative to control pain without hampering the tooth movement is essential. *Arnica* has a wide scope in the field of dentistry to control intraoperative and post-operative orthodontic pain without hampering the tooth movement. *Arnica* can also be used in patients undergoing multidrug therapy to prevent adverse drug interaction. Therefore, to keep up with the paradigm shift, there is a need to replace the use of NSAIDs in orthodontics to complimentary *Arnica*. However, further research and clinical studies are yet needed to understand and demonstrate the benefits of *Arnica* over NSAIDs fully. Clinical trials will majorly help us determine its clinical efficacy in day to day orthodontics.

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