

2015

Is Ginger Effective in Reducing Knee Pain in Adults With Osteoarthritis?

Joseph Heng

Philadelphia College of Osteopathic Medicine, Josephhen@pcom.edu

Follow this and additional works at: http://digitalcommons.pcom.edu/pa_systematic_reviews



Part of the [Musculoskeletal Diseases Commons](#)

Recommended Citation

Heng, Joseph, "Is Ginger Effective in Reducing Knee Pain in Adults With Osteoarthritis?" (2015). *PCOM Physician Assistant Studies Student Scholarship*. 225.

http://digitalcommons.pcom.edu/pa_systematic_reviews/225

This Selective Evidence-Based Medicine Review is brought to you for free and open access by the Student Dissertations, Theses and Papers at DigitalCommons@PCOM. It has been accepted for inclusion in PCOM Physician Assistant Studies Student Scholarship by an authorized administrator of DigitalCommons@PCOM. For more information, please contact library@pcom.edu.

Is Ginger Effective in Reducing Knee Pain in Adults With Osteoarthritis?

Joseph Heng, PA-S2

A Selective Evidenced Based Medicine Review

In Partial Fulfillment of the Requirements For

The Degree of Master of Science

In

Health Sciences- Physician Assistant

Department of Physician Assistant Studies
Philadelphia College of Osteopathic Medicine
Philadelphia, Pennsylvania

December 19, 2014

Abstract

Objective: The objective of this evidence based medicine review is to determine whether ginger is effective in reducing knee pain in adults with osteoarthritis.

Study Design: Three double blind, randomized controlled trials were reviewed and selected based on their relevance to the clinical question and their inclusion of patient oriented outcomes (POEMS).

Data Sources: Each study was obtained by searching Cochrane and PubMed database.

Outcome measures: The outcomes were measured using the Western Ontario and McMaster Universities Osteoarthritis index (WOMAC) via Likert scale and Knee Pain rated via Knee injury and knee Osteoarthritis Outcome score (KOOS) questionnaire which is a knee specific instrument and is an extension of the WOMAC.

Results: The results of Chopra et al. study showed that the Ayurvedic formulations specifically SGCG, significantly reduced knee pain and were equivalent to glucosamine, with a score of -0.050 to 1.32 utilizing intent-to-treat analysis (ITT) with 95 % confidence interval (CI). The WOMAC pain score mean decreased of 24.22% and 29.15% at the end of the trial respectively utilizing ANOVA with $P = 0.14$ ⁴. The Nieman et al. study showed the WOMAC pain score mean was significantly reduced in the Instaflex group compared to placebo group with a 37% decrease versus a 16% decrease, respectively utilizing ANOVA with $P = 0.025$ ⁵. The Niempoog et al. study show no statistical significance in the KOOS pain score mean between with the experimental group as compared to the placebo group, utilizing ANOVA with $P > 0.05$ ⁶.

Conclusions: Although there was conflicting evidence in the current literature, two out of the three RCTs demonstrated positive outcomes with ginger or ginger containing capsules in the treatment of osteoarthritis knee pain.

Keywords: ginger, zingiber officinale, knee pain, and osteoarthritis

Introduction

Pain, perhaps the most common ailment of human existence, it comes in many forms and affects everyone differently. Children tend to suffer more from acute conditions. Conversely, the older population suffer more from chronic conditions such as osteoarthritis. Osteoarthritis is the most common type of arthritis and affects over 27 million people in America^{1,2}. It is commonly referred to as degenerative joint disease with various etiology ranging from idiopathic, genetics, repetitive use, congenital, metabolic, traumatic, and other causes. It is characterized as a progressive loss of the hyaline cartilage of joints and changes of the underlying cortical bone. Diagnostic changes are typically noted with plain film radiographs that show asymmetric joint narrowing, sclerosis, and osteophyte formation affecting primarily weight bearing joints such as the knees³. With the aging population, health care professionals can expect to encounter more patients with this condition in all clinical specialties and settings. The CDC estimated \$28.5 billion was spent on hospital cost for total knee replacements in 2009. The rate of knee osteoarthritis has increased 187% from 1991 to 2006. In the United States Osteoarthritis accounted for 814,900 hospitalizations and accounted for 69% of all arthritis related hospitalizations in 2006³. Medical treatments includes topical and oral analgesics, acetaminophen, NSAIDs, narcotics, hyaluronan injections and steroid injections. Surgical treatments include bone spur removal and partial or total knee replacement. Conservative treatments include weight control, life style modifications, and physical therapy such as joint mobility exercises, stretches, and aqua therapy. Supplements that are typically used to treat osteoarthritis are glucosamine and chondroitin³. The treatments mentioned above have been shown to be an effective

Heng, Ginger Therapy 2

treatment for osteoarthritis however, most of the treatments only treat the symptoms and results varies. Long term use can also lead to different adverse effects such as ulcer formations with the use of NSAIDs or complications from surgeries. The studies in the review evaluated the effects of ginger and knee pain associated with osteoarthritis. Ginger has natural pain relief and anti-inflammatory properties and has been used in other countries, mainly in the Eastern countries to relieve pain and inflammation.

Objective

The objective of this selective evidence based medicine review is to determine whether ginger is effective in reducing knee pain in adults with osteoarthritis.

Methods

The studies that are included in this review consist of three randomized controlled trials (RCTs). The population consists of adult males and females age 40-75 years old with joint pain. The intervention used were ginger or ginger containing supplements in various forms. In the Chopra et al. study, the intervention used was an Ayurvedic formulation that contained zingiber officinale which is the plant name of ginger mixed with other ingredients in a capsule form and was compared to 2 grams of glucosamine sulfate capsule. Two visually matched capsules were taken three times daily in the experimental and comparison groups for 24 weeks. In the Nieman et al. study, the intervention used was an "Instaflex" supplement capsules that contained 50 mg of ginger root extract and other ingredients taken 3 times daily and was compared to a visually matched placebo taken the same amount of times daily for 8 weeks. In the Niempoog et

Heng, Ginger Therapy 3

al. study, the intervention used was 500 mg of powdered ginger in capsule form with a visually matched placebo for the control group taken twice a day for 8 weeks.

The keywords used in the searches were "ginger", "zingiber officinale", "knee pain", and "osteoarthritis". All of the RCTs articles reviewed in this systematic review were published in English in peer reviewed journals and found on PubMed database. The articles were selected based on the relevance and significance to the clinical question posed and on the basis that they had on patient oriented outcomes (POEMS).

The inclusion criteria included articles that were published after 2011 consisting of adult male and female patients with age ranging from 40-75 years old. The patients in the articles were either diagnosed with knee osteoarthritis, diagnosed with osteoarthritis based on clinical criteria, or had a history of joint pain of greater than 3 months.

Exclusion criteria in the RCTs were patients that were pregnant, lactating, potential childbearing females, patients with non-degenerative joint disorders, or severe disabling arthritis. Patients on certain medication that may alter efficacy of study treatment, history of peptic ulcer or recent active peptic ulcer and patients with any unstable severe medical conditions were excluded. Patients with a history of regular NSAID use or any other analgesics or supplements in the previous 2 weeks were excluded. Patients that have shellfish or aspirin allergy history, serious medical or psychiatric problems, knee deformity or lower extremity surgery were also excluded. All the studies utilized in this review dealt with disease oriented outcomes (DOE). The summary statistical analysis utilized in the studies reviewed included ANOVA, intent-to-treat, P values, NNH, and confidence interval.

Outcomes Measured

Outcome measures used included pain scores based on discomfort, functional abilities, and active pain on body weight-bearing activity (e.g. walking) during the preceding 24 hours was recorded via the Western Ontario and McMaster Universities Osteoarthritis index (WOMAC) questionnaire utilizing categorical scoring with: none = 0, mild 1, moderate = 2, severe = 3, extreme = 4. Knee pain rated via Knee injury and knee Osteoarthritis Outcome score (KOOS) questionnaire which is a knee specific instrument and is an extension of the WOMAC.

Table 1 - Demographics & Characteristics of included studies

Study	Type	# pts	Age (yrs)	Inclusion criteria	Exclusion criteria	W/D	Interventions
Chopra 2013 ⁴				40-70 y/o Diagnosis of knee OA.	Pregnant, lactating, or potential childbearing women. Pts with non-degenerative joint d/o. Severe disabling arthritis and lower limb surgery. Patients on certain medication that may alter efficacy of study treatment, history of peptic ulcer bleed or recent active peptic ulcer and patients with any unstable severe medical.	126	Ayurveda formulation capsule containing Zingiber officinale (ginger plant) and other ingredients
Nieman 2013 ⁵	Double blind RCT	108	50-75 y/o	50-75 y/o History of joint pain > 3 months using WOMAC score of at least 2. Able to walk brisk pace for 6 minutes.	History of regular NSAID use or any other analgesics or supplements in the previous 2 weeks. Shellfish or aspirin allergy history. Serious medical or psychiatric problems.	7	Instaflex supplement capsules that contained ginger root concentrate and other ingredients
Niempoog 2012 ⁶	Double blind RCT	60	Average age 49 y/o	OA dx based on clinical criteria.	Knee deformity or lower extremity surgery in last 6 months. Analgesic and/or NSAIDs 2 weeks prior to study.	11	Dry powdered ginger capsule

Results

All three articles reviewed were randomized controlled trials (RCTs) and all assessed the efficacy of ginger supplements in various forms in the treatment of knee pain due to osteoarthritis. Two of the studies used a placebo group and one used glucosamine as the comparative group. All three studies randomized their sample population and matched them to the experimental and control groups. The withdrawal rate of the studies by Chopra et al., Nieman et al., and Niempoog et al. were 28.6%, 6.48%, 18.3% respectively^{4, 5, 6}.

In the study by Chopra et al., the intent-to-treat (ITT) data for SGCG group to the Glucosamine group mean score went from -0.50 to 1.32 with 95% confidence interval (CI) was statically significant and suggests that the experimental treatment was as effective as the glucosamine group in a head to head comparison in regards to pain relief. The mean score of the experimental SGCG group at the end of the 24 weeks trial showed a decrease of 2.26 or 24.22% and the Glucosamine comparison group showed a decrease of 2.27 or 29.15% utilizing ANOVA with $p = 0.14$. In the Nieman et al. study, the results was also statistically significant when comparing the experimental group to the placebo group in decreasing pain in the 8 week trial. The mean scores showed a decrease of 10.4 or 37% in the experimental Instaflex group and the placebo group showed a decrease of 5.4 or 16% utilizing ANOVA with $p = 0.025$. In the Niempoog et al. study, the data was shown in a bar graph form with improved mean scores for both the ginger experimental group and placebo group at the end of the 8 week trial The results did not reflect any statistical significance for the experimental group as compared to the placebo group utilizing ANOVA with $p > 0.5$.

Heng, Ginger Therapy 6

In the Chopra et al. study, 9.7% of the SGCG experimental group experienced epigastric pain vs. 14.8% of the Glucosamine comparison group⁴. In the Nieman et al. study, no adverse symptoms were reported⁵. In the Niempoog et al. study, 3.8% of the Ginger experimental group experienced heartburn vs. 13% of the placebo control group⁶.

Table 2- Comparison and statistical significant of outcomes measured of included studies

	Outcome measured	Scoring system	Mean scores (percentage)	p-value	Statistically Significant?
Chopra 2013 ⁴	Pain (24 weeks)	WOMAC	SGCG ↓2.26 (↓24.22%) Glucosamine ↓2.27 (↓29.15%)	P = 0.14 ANOVA	NO
Chopra 2013 ⁴	Pain (24 weeks)	WOMAC	SGCG – Glucosamine - 0.50 to 1.32		Yes, ITT 95% CI
Nieman 2013 ⁵	Pain (8 weeks)	WOMAC	Instaflex ↓10.4 (↓37 %) Placebo ↓5.4 (↓16 %)	P = 0.025 ANOVA	Yes
Niempoog 2012 ⁶	Pain (8 weeks)	KOOS	Ginger-graph showed improvement of pain at end of trial Placebo- graph showed improvement of pain at end of trial	P > 0.05	No

Table 3- Efficacy of ginger in the treatment of knee osteoarthritis pain: NNH

Study	Control event rate	Experimental event rate	Relative risk increase	Absolute risk increase	Number needed to harm
Chopra 2013 ⁴	0.148 %	0.097 %	- 0.346 %	- 0.51 %	- 19
Nieman 2013 ⁵	n/a	n/a	n/a	n/a	n/a
Niempoog 2012 ⁶	0.13 %	0.038 %	- 0.71 %	- 0.092 %	- 10

Discussion

After reviewing the results in the studies of this systematic review, several factors must be considered when interpreting the results. First of all, various forms of ginger were used in the studies with some formulation having other ingredients in addition. The sample sizes in the studies ranged from 60-440 patients and utilized different criteria for

Heng, Ginger Therapy 7

patient selections and length of study. The withdrawal rate of the studies ranged from 6.48 % - 28.6 %. However, despite these varying factors, ginger has been utilized in other parts of the world and has been thought to have anti-inflammatory and pain reducing characteristics. With that in mind, ginger may be considered as a natural adjunct treatment and/or alternative to conventional pain and anti-inflammatory treatments. More studies investigating the singular effects of ginger needs to be studied. Purity and/or better quality ginger containing supplements, with larger population sample sizes, longer trials, and uniformed selection criteria to evaluate the efficacy of ginger as a treatment for osteoarthritis knee pain should be incorporated into future studies.

Conclusions

Although there were conflicting evidence in the current literature, two out of the three RCTs demonstrated positive outcomes with ginger in the treatment of osteoarthritis knee pain. Two of the studies results showed significant improvements in the treatment of osteoarthritis knee pain, one study showed no significant findings as compared to the placebo group. Therefore, more research needs to be conducted utilizing ginger perhaps as a singular treatment. The sample size, withdrawal rate, study length, experimental design, and quality of the supplement should also be considered in future studies. Ginger may be a good adjunct or alternative to consider with patients that are unable to be treated with traditional osteoarthritis anti-inflammatory treatments.

References

1. Osteoarthritis: WebMD. <http://www.webmd.com/osteoarthritis/guide/ostearthritis-of-the-knee-degenerative-arthritis-of-the-knee>. Accessed September 27, 2014.
2. Arthritis facts: Arthritis foundation. <http://www.arthritis.org/arthritis-facts/disease-center/osteoarthritis.php>. Accessed September 27, 2014.
3. Arthritis: CDC. <http://www.cdc.gov/arthritis/basics/osteoarthritis.htm>. Accessed September 27, 2014.
4. Chopra A, Saluja M, et al. Ayurvedic medicine offers a good alternative to glucosamine and celecoxib in the treatment of symptomatic knee osteoarthritis: a randomized, double-blind, controlled equivalence drug trial. *Rheumatology (Oxford)*. 2013 Aug;52(8):1408-17.
5. Nieman DC, Shanely RA, et al. A commercialized dietary supplement alleviates joint pain in community adults:a double-blind, placebo-controlled community trial. *Nutr J*. 2013 Nov 25;12(1):154.
6. Niempoog S, Pawa KK, et al. The efficacy of powdered ginger in osteoarthritis of the knee.: a double-blind, randomized, controlled trial. *J Med Assoc Thai*. 2012 Jan;95 Suppl 1:S59-64.