Progressive Research Assignment Part 1A and 1B

Question
Is the homeopathic remedy, Arnica montana, effective perioperatively in decreasing ecchymosis and edema post-rhinoplasty in men and women over 16 years old?

Target Population
Men and women over the age of 16 who are seeking to have rhinoplasty for cosmetic or reconstructive purposes.

Intervention
The intervention of interest is the homeopathic remedy, Arnica montana, to be used perioperatively. The random controlled trial failed to mention the dose but stated it was taken three times a day for four days. The study also failed to mention at what point during the surgical process when the patients started taking arnica.

Comparative population/treatment
The comparative population/treatment would be adult men and women who received a placebo post-rhinoplasty to decrease ecchymosis and swelling.

Defining outcomes
Outcomes would be measured by subjective differences by the patients, as well as objective differences measured by the plastic surgeon for ecchymosis and edema. In addition, postoperative photographs for color changes and postoperative ecchymosis assessments would be used.

Etiology, prevalence and justification
This intervention is of significant relevance since ecchymosis and edema are the most common side effects during the recovery period post-rhinoplasty. The cause of ecchymosis, according to Golger, is due to osteotomy, or breaking of nasal bones, which is often required during a closed rhinoplasty (1). According to the Canadian Society of Plastic Surgeons website, bruising is typically diminished after a week, however, swelling post-surgery can last multiple weeks or months (8).

It is difficult to detect the prevalence of ecchymosis and edema resulting from rhinoplasty in Canada since the statistics are non-existent because plastic surgeons do not maintain statistics in Canada (8). Also, Canada only has 575 plastic surgeons, only 1.2% of the world’s plastic surgeons, according to the International Society for Aesthetic Plastic Surgery website (3), so the prevalence of ecchymosis and edema with rhinoplasty is lower in Canada compared to countries like Brazil and the United States.
To show the prevalence of ecchymosis and edema post-rhinoplasty on a global scale, there were 730,287 rhinoplasty surgeries performed in 2015, 7.6% of the total plastic surgeries performed globally (3). Further, “Women had more than 18 million surgical and non-surgical procedures performed globally in 2015, 85.6% of the total. The top five surgical procedures performed on women in 2015 were: breast augmentation, liposuction, eyelid surgery, abdominoplasty and rhinoplasty. Men had more than 3 million surgical and non-surgical procedures, 14.4% of the total. The top five surgical procedures performed on men were: eyelid surgery, liposuction, gynecomastia surgery, rhinoplasty, fat grafting and ear surgery” (2). Therefore, the numbers of patients world-wide with ecchymosis and edema post-rhinoplasty are significant.

There are other effective alternatives to reducing ecchymosis and edema post-rhinoplasty, such as steroid use and placebo. A study done by The Catholic University of Korea, College of Medicine, found that edema and eyelid ecchymosis was reduced by perioperative steroid use and multi-dose steroid use was more effective than single use (5). However, according to the Mayo Clinic, there are multiple side effects with steroids, such as prednisone and corticosteroids. Some of the side effects of oral steroid use include: "elevated pressure in the eyes (glaucoma), fluid retention, causing swelling in your lower legs, high blood pressure, problems with mood, memory, behavior and other psychological effects, and weight gain, with fat deposits in your abdomen, face and the back of your neck" (6). Injected steroids may cause side effects such as “skin thinning, loss of color in the skin, facial flushing, insomnia and high blood sugar” (6). Although there are a wide variety of side effects from corticosteroids, there are many benefits as well such as relieving "inflammation, pain and discomfort of many different diseases and conditions” (6). The health care provider weighs the safety and risk analysis when using steroids. In the case of placebo, there is no risk in safety by allowing the body to heal itself post-rhinoplasty. Often, cold packs are suggested as a way to decrease edema, which have minimal risk.

There would be a significant value for patients who find homeopathic Arnica montana to reducing swelling and ecchymosis post-rhinoplasty, if proved to be true. If Arnica montana decreased healing and recovery time for patients undergoing rhinoplasty or other facial reconstruction or cosmetic procedures, there would be an increased level of patient satisfaction in recovery outcomes. In addition, there would also be satisfaction for the surgeon in knowing that his patients are healing quickly and seeing the results faster as edema decreases.

I am personally interested in this topic since I have had reconstructive rhinoplasty due to my nose being previously broken and was instructed by my plastic surgeon to take the homeopathic Arnica montana to reduce edema and bruising. Although it worked very well for me, I was not able to find any research studies at the time to back my surgeon’s support for the homeopathic remedy. Also, I am interested in working with plastic surgery patients in the future and hope to reduce their healing time. By having research studies to share with patients that Arnica montana is an effective treatment, I will feel supported in giving it to them and they can also make a decision to take it or not. However, I am also open to studies that show its ineffectiveness to get a well-rounded and unbiased picture of what
has been done in research on this topic. I want to be certain that what I am telling my patients is true and backed by evidence when it comes to the effectiveness of arnica.

Based on available research, and, in particular, the study done by The Catholic University of Korea, College of Medicine, there has been success as well with using steroids in contrast to the control group to decrease upper and lower edema and ecchymosis post-rhinoplasty (5). Also, research has successfully shown the use of ice cold swabs in decreasing edema post-septoplasty with better post-operative cosmetic results (4).

Searches

<table>
<thead>
<tr>
<th>Database</th>
<th>Search Terms</th>
<th>PubMed MeSH terms or MeSH classification tree</th>
<th>Limits Set</th>
<th>Number of articles search returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>PubMed</td>
<td>Arnica + therapeutic use</td>
<td>&quot;Arnica/therapeutic use&quot;</td>
<td>Humans English 10 Years</td>
<td>4</td>
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<tr>
<td>PubMed</td>
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<td>&quot;Arnica/therapeutic use&quot;</td>
<td>Humans English 10 Years</td>
<td>4</td>
</tr>
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<td>None</td>
<td>2</td>
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<tr>
<td>PubMed</td>
<td>Rhinoplasty + edema</td>
<td>N/A</td>
<td>Humans English 10 Years</td>
<td>73</td>
</tr>
</tbody>
</table>

I primarily searched PubMed since it covers a wide range of databases that would otherwise take a longer amount of time to research individually to find the same studies. I also was able to find a systematic review on PubMed for the use of homeopathic Arnica in reducing edema and ecchymosis post-rhinoplasty. I did not find as many search results in the Cochrane Library — only 2.

In order to get a larger picture of my topic, I had to search for ‘ecchymosis and rhinoplasty’ or ‘edema and rhinoplasty’ to find the other treatments and clinical trials that were performed to get a better understanding of the effectiveness and safety of the other treatments. During the searches, I also made sure to set limits on only human trials since I wanted to gather information on how Arnica affected humans, since this is the population I will want to focus on. In addition, I made sure the language was set to English since I am not fluent in reading studies in other languages. Finally, I only searched for studies on
Arnica that were 10 years old because I wanted to have the most up-to-date research studies. Also, since millennial rhinoplasty and other plastic surgeries have been on the rise from previous generations (8), I felt it was important to gather this research from the past 10 years.

**CAP Part 2**

The effects of the homeopathic Arnica montana on reducing ecchymosis and edema post-rhinoplasty

**Systems Involved:** Integumentary and musculoskeletal systems

**Therapeutic Modality Used:** Homeopathy

**Paper Title:** A Randomized, Controlled Comparison between Arnica and Steroids in the Management of Postrhinoplasty Ecchymosis and Edema

**Authors:** Totonchi A. and Guyuron B.

**Journal:** Plastic and Reconstructive Surgery

**Publication:** 2007 July

**Aim:** To compare the effectiveness between the homeopathic Arnica montana and corticosteroid use in the decrease of ecchymosis and edema post-rhinoplasty.

**Design:** The study is a randomized single-blinded placebo-controlled trial.

**Setting:** The researchers do not state where the research took place. The data is from the Department of Plastic Surgery at Case Western Reserve University, Cleveland, Ohio. It is unclear whether the research took place at Case Western Reserve University.

**Participants:** There were 48 patients who took part in the study, 11 male and 37 females (9). All of the patients had rhinoplasty with osteotomy (9). There was no exclusion criteria listed in the study. The study doesn’t state from where the participants were recruited. The study states that the 48 patients were randomized into three groups but does not give any further details about how the randomization was conducted or if the groups were equal.

**Intervention(s):** Patients were randomly divided into three groups. The research didn’t state how many participants were in each group. Group P “received 10mg of dexamethasone (intravenously) intraoperatively followed by a 6 day oral tapering dose of methyl-prednisone” (9). The research does not determine how much methyl-prednisone. Group A received arnica “three times a day for 4 days” (9). Group C, the control, did not receive anything (9).
Main outcome measure(s): The study was measuring the intensity of ecchymosis and extent of edema post-rhinoplasty. The study measured ecchymosis and edema in the following table (9):

<table>
<thead>
<tr>
<th>Rating</th>
<th>Extent of Ecchymosis</th>
<th>Color Density (intensity of ecchymosis)</th>
<th>Edema</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No ecchymosis</td>
<td>No color change</td>
<td>No edema</td>
</tr>
<tr>
<td>1</td>
<td>Up to medial one-third of the lower and/or upper eyelid</td>
<td>Yellowish color change</td>
<td>Mild edema</td>
</tr>
<tr>
<td>2</td>
<td>Medial half of the upper and/or lower eyelid</td>
<td>Light purple</td>
<td>Moderate edema</td>
</tr>
<tr>
<td>3</td>
<td>Entire upper and/or lower eyelid</td>
<td>Dark purple</td>
<td>Severe edema</td>
</tr>
<tr>
<td>4</td>
<td>Entire part of the lower and upper eyelid and/or conjunctiva</td>
<td>Very dark purple</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>Extension of ecchymosis below the malar bone</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Summary of key findings & results:

- The control group had more edema on day 2 after surgery than the other two groups who received arnica and methyl-prednisone.
- After 8 days post-surgery, the steroid group had only a reduction of 5% in the extent of ecchymosis (2.73)\(^9\) than the control (2.17)\(^9\) (34%) and the arnica group (1.42)\(^9\) (51%).
- When looking at the difference between day 2 and day 8 after surgery, the arnica group and control group had greater decreases of intensity of ecchymosis than the steroid group (both by 55%). (9)

Fig. 1: The table below shows the mean rating scores from the study: (9).

<table>
<thead>
<tr>
<th>Extent of ecchymosis</th>
<th>POD 2</th>
<th>POD 8</th>
<th>Difference (POD 2–8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>2.90</td>
<td>1.42</td>
<td>1.48</td>
</tr>
<tr>
<td>Group P</td>
<td>2.88</td>
<td>2.73</td>
<td>0.56</td>
</tr>
<tr>
<td>Group C</td>
<td>3.31</td>
<td>2.17</td>
<td>1.15</td>
</tr>
</tbody>
</table>

\(p = 0.19\) \(p < 0.05\) \(p < 0.05\)

<table>
<thead>
<tr>
<th>Intensity of the ecchymosis</th>
<th>POD 2</th>
<th>POD 8</th>
<th>Difference (POD 2–8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>2.06</td>
<td>0.92</td>
<td>1.15</td>
</tr>
<tr>
<td>Group P</td>
<td>2.52</td>
<td>1.85</td>
<td>0.67</td>
</tr>
<tr>
<td>Group C</td>
<td>2.29</td>
<td>1.02</td>
<td>1.27</td>
</tr>
</tbody>
</table>

\(p = 0.06\) \(p < 0.01\) \(p < 0.05\)

<table>
<thead>
<tr>
<th>Severity edema</th>
<th>POD 2</th>
<th>POD 8</th>
<th>Difference (POD 2–8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>1.19</td>
<td>0.15</td>
<td>1.04</td>
</tr>
<tr>
<td>Group P</td>
<td>1.02</td>
<td>0.08</td>
<td>0.94</td>
</tr>
<tr>
<td>Group C</td>
<td>1.96</td>
<td>0.25</td>
<td>1.71</td>
</tr>
</tbody>
</table>

\(p < 0.0001\) \(p = 0.25\) \(p < 0.0001\)

POD, postoperative day.
• Arnica showed the greatest extent of reducing the extent of ecchymosis by 51%. This finding is of statistical significance because this shows that the homeopathic Arnica montana decreased ecchymosis more than steroids or from the patient taking nothing. However, the researchers did not find the 51% statistically significant because the p value was < 0.05, which indicates that 5% could have been caused by chance.
• The severity in edema decreased the most in the steroid group (.94) (92%), followed by the control group (1.71) (87%) followed by the arnica group (1.04) (47%)(9). This finding shows that steroids were more successful at decreasing edema than the homeopathic Arnica montana or from taking nothing at all. The arnica group did, however, decrease by 87% and the researchers did find this statistically significant (with a p value of <0.0001).

The researchers do not note the relative or absolute risk reduction, adverse reactions, or participant retention.

Authors Conclusion: The authors of the study came to the conclusion that both arnica and corticosteroids are effective at reducing swelling post-rhinoplasty two days post-surgery. However, the researchers were concerned about the increase in bruising with the corticosteroid group. Since there was a delay in bruise reduction with the corticosteroids, the researchers are not certain about the effectiveness of corticosteroids to decrease ecchymosis post-rhinoplasty. In addition, the researchers were concerned about the side effect of perioperative hypertension from the corticosteroids, possibly leading to an increase in bruising post-rhinoplasty.

Quality of the evidence: The evidence in this RCT is not consistent with three other RCTs measuring the effect of corticosteroids on reducing edema and ecchymosis post-rhinoplasty. Since the research methods are unclear and show conflicting scientific evidence, this paper receives a C (Unclear of Conflicting Scientific Evidence) according to CAP guidelines.

Conflict of interest: There were no conflicts of interest or commercial affiliation from any of the authors.

Cost effectiveness: The cost effectiveness was not taken into consideration for this study. However, since homeopathic remedies are inexpensive, around $10, and if they are able to help patients heal faster from surgery, it would be cost effective to do the research. However, the researchers did not address this in the study.

Discussion:

Strengths of the research:
• When compared to other RCTs about the effectiveness of arnica in reducing edema, the research was very similar in that they found that arnica was very effective in reducing edema (9, 14).
• This was the first RCT of its kind to compare the use of arnica and corticosteroids in the same study to reduce ecchymosis and swelling post-rhinoplasty (9). This is a strength because this study combines both protocols (arnica and steroids) and compares their results, whereas other studies have not done this comparison.

• The researchers included other studies showing pros and cons about the effectiveness of arnica in reducing bruising and swelling post-rhinoplasty, such as Ernst and Pittler’s meta-analysis of eight studies that stated arnica is ineffective and no better than a placebo (9). Upon further research into the meta-analysis, it stated that ‘most of the studies were burdened with severe methodological flaws’ so the data is not completely reliable (10).

• The study has very high internal validity in that it completed what it set out to do in comparing the efficacy of the homeopathic Arnica montana and steroids post-rhinoplasty.

• Comparing the use of Arnica montana and steroids gave this study moderately high external validity since post-rhinoplasty patients will have these three options open to them (Arnica, steroids, or nothing). These are typical options in the real world.

Limitations of the research:
• The authors do not state the dose of arnica used in the trial. Even though the arnica proved to be effective, it would have been helpful to see what dose the researchers actually used compared to other similar studies that used arnica. The Chaiet study stated all of the doses and strengths of the homeopathic Arnica montana that were used in their study. (13) Excluding the dose of arnica that was used in the Totonchi and Guyuron study, hinders external validity since it is unclear at what dose patients should take the homeopathic Arnica montana in the real world post-rhinoplasty to decrease ecchymosis and edema. The internal validity still remains high in the study because the researchers did effectively compare arnica and steroids in their benefits post-rhinoplasty.

• The timing of when the steroid and arnica was taken is unclear, which may have affected the data. Group P was given the steroid, dexamethasone, intravenously (10 mg) during surgery and then Group P received an oral dose of methyl-prednisone for 6 days (9). The study also does not state the dose of methyl-prednisone. The study also says that Group A received arnica “three times a day for four days”9 but does not state when the patients started taking arnica. This is significant limitation because we do not know if the steroid started working quickly by day 2 and started to drop off. Also, if arnica was taken pre-operatively, could it have presented a more statistical finding? It is unclear in this study. Also, not including the doses and timetables of the steroids and arnica decreases the external validity of this study since it would be difficult to replicate and get identical results.
• It is unclear how many people were divided into the control groups. If the control groups were severely uneven, it could have affected the data reliability. In particular, if there were only 3 people in 1 group and they had a different reaction to the steroid or arnica, it could have thrown off the results.

• The study does not mention how many surgeons did the rhinoplasties. Having multiple surgeons perform the rhinoplasties could have been a possible factor in the edema or ecchymosis. Some comparable RCTs mention that they used one surgeon and another RCT used 3 surgeons during the study (11). In addition, if there was a different surgeon per group, it could have affected the internal validity of the study because having a different surgeon could have added another variable when the study was set out to compare steroids and arnica post-rhinoplasty.

• The researchers do not mention what surgical instruments were used in the study. If there were different surgical instruments, this could have been another factor that could have contributed to the bruising and swelling. The Kargi study states that “the same surgical instruments” were used by all of the surgeons.

• The researchers did not take a baseline reading for the extent and intensity of ecchymosis and severity of edema. The data could have been more reliable if the baseline was known.

• There was no inclusion or exclusion criteria listed for the patients. It is unclear if there were patients who were excluded for any reason.

• The authors did not calculate the number needed to treat or number needed to harm.

• The research did not indicate that the participants were blinded. This could be a limitation of the study because if participants knew they were not receiving any treatment, they may be less likely to comply with the study. There is a definitely a possibility that there was little compliance with the control group. The study also did not indicate if the participants were allowed to take any ibuprofen or any other pain reliever after surgery that could also act an anti-inflammatory. This could have been another variable that would have altered the data.

How the study’s findings add to the body of research: The Totonchi and Guyuron study found that both corticosteroids and the homeopathic Arnica montana were effective in reducing edema post-rhinoplasty within 2 days post-op and with resolution after 8 days (9). Also, they also discovered that the group given corticosteroids exhibited and increased intensity of ecchymosis than the Arnica or control groups (9). The researchers attribute this factor to perioperative hypertension that could have increased ecchymosis (9). Also, they found that arnica did not significantly decrease the extent and intensity of ecchymosis post-rhinoplasty. These findings add to the field of research on this topic since surgeons may not want to suggest corticosteroids to reduce ecchymosis post-rhinoplasty even if
corticosteroids help to reduce swelling. Also, if patients have hypertension, they may exhibit the undesired effect of increased bruising post-rhinoplasty. The research is in alignment with similar studies and have also found that arnica is not beneficial in decreasing the intensity and extent of ecchymosis post-rhinoplasty (9,10).

**Application of results to patients:** The research from the RCTs about the effectiveness of the homeopathic Arnica montana shows that arnica is safe and is effective in a perioperative setting (13). In addition, arnica is an effective homeopathic to reduce edema post-rhinoplasty. This result in effective reduction of swelling post-rhinoplasty will add to patient satisfaction with their rhinoplasty and healing experience.

**Further work/research needed:** In order to accurately find the most effective amount of the homeopathic Arnica montana to reduce ecchymosis and edema, more research needs to be done. Since the RCTs have varying or no dose of Arnica listed, it is difficult to find what the most effective dose would be to decrease bruising post-rhinoplasty. Further research should be conducted to find out this information.

**Progressive Research Assignment Part 3:**

**Finding further evidence:** It was learned in part 2 that the homeopathic Arnica montana is effective in decreasing edema post-rhinoplasty. However, it was found that arnica is not significantly effective in decreasing the extent and intensity of ecchymosis after rhinoplasty. Since arnica has traditionally been used to decrease bruising and many surgeons suggest its use to decrease ecchymosis post-rhinoplasty, I believe it would be beneficial to find further evidence to support this claim. In addition, I would be interested to see the studies, including the dose and timetable, that have been done by Alpine Pharmaceuticals to support their claim that arnica decreases bruising after surgery. I would look for double-blind RCTs to find further evidence that state the dose and time interval that arnica was used. It would be beneficial to see if arnica needs to be taken one week prior to surgery in order to decrease bruising. Perhaps there is a specific window, as well as effective dose, before and after for arnica to be taken to be effective in decreasing bruising after rhinoplasty. I would be interested in further research that shows this.

**Application of results to patient management:** In the Totonchi and Guyuron study, the researchers found both corticosteroids and the homeopathic Arnica montana were effective in reducing edema post-rhinoplasty⁹, as previously stated in section 2. They did not indicate that arnica or corticosteroids were effective in reducing the intensity and extent of ecchymosis post-rhinoplasty. However, although they did use the homeopathic Arnica montana formulation SinEcch by Alpine Pharmaceuticals, San Raphael, Calif., the patient dose and time schedule were not stated (17). The package has specific dosing instructions and states that the product has 500mg of Arnica montana 1M and 500 mg of Arnica montana 12C but it is not clear if the researchers had the patients follow the instructions on the package. Because of this lack of detail, it makes it difficult to translate this study to patient management. Without proper dosage or a timeframe, it is unclear how Arnica montana would be used to decrease edema effectively, like the study suggests. More
research is required to find an effective dosing and time-table to take arnica orally to be able to decrease edema after rhinoplasty.

Fig. 2: Packaging from SinEcch (Alpine Pharmaceuticals, San Raphael, Calif. (17)

Whether or not the information gathered in Part 2 assists in answering the question identified in part 1: The information gathered in part 2 assists in answering only half of the original question in part 1 about the homeopathic remedy, Arnica montana, being effective perioperatively in decreasing ecchymosis and edema post-rhinoplasty in men and women over 16 years old. The information in part 2 finds that arnica is effective in decreasing edema post-rhinoplasty but does not find it effective in decreasing ecchymosis. More research is needed to answer the second half of the question with regards to alleviating ecchymosis post-rhinoplasty.

Other research that supports or contradicts the evidence obtained in Part 2: The Chaiet and Marcus study (2016) contradicts the Totoch and Guyuron (2005) study in its findings. The Chaiet and Marcus study finds that the homeopathic Arnica montana is effective in decreasing the extent and the intensity of ecchymosis after osteotomies in rhinoplasty surgery, which may dramatically affect patient satisfaction (13). It is
interesting to note that in the Chaiet and Marcus study, the patients were given the same formulation of the homeopathic Arnica montana by SinEcc17 that was used in the Totonchi and Guyuron study, which contains 12 capsules of (SinEch 01) 500 mg of A. montana 1M and (SinEch 02) 500mg of A. montana 12C13. However, the patients in the Chaiet and Marcus study were ‘given V500 mg of A. montana 1M preoperatively on the morning of surgery and two more later that day after surgery, and 500 mg of A. montana 12C was given orally 3 times daily for the next 3 days, where “C” indicates a 100-fold serial dilution; and M, a 1000-fold serial dilution’ (13). Since the patients’ dose and schedule in the Totonchi and Guyuron study are unclear, it is still interesting to note that the same formulation was used in both studies. Furthermore, by increasing the dose post-operatively by having the patient take 2 V500 mg of A. montana 1M, and then having the patient take the 12C formulation for 3 times a day for the next 3 days13, a difference was seen in the reduction of the intensity and extent of ecchymosis.

Next, the Seeley and colleagues study16, also found in in the Ho and colleagues systematic review15, discovered that the same SinEch17 formula reduced the extent but not intensity ecchymosis post-rhytidectomy when given 1M preoperatively on the morning of surgery and continued every 8 hours for 4 days15. The study does not indicate at what point the patients began to take the 12C formula and stopped the 1M A. montana.

Both the Ho and colleagues and Ernst and Pittler systematic reviews found that arnica montana is insufficient when compared to placebo post-procedure for ecchymosis and edema (10, 15). However, in the Ernst and Pittler review, it is interesting to note that they stated: “The existing studies could be severely flawed and therefore produce a misleading result. The trials certainly are burdened with a multitude of methodological limitations. Small sample size and lack of test statistics are frequent and obvious ones. However, such drawbacks would be likely to create false-positive rather than false-negative result. Arnica could have been applied wrongly.”

Overall, there is both supportive and conflicting information with regards to the use of the homeopathic A. montana to reduce ecchymosis and edema post-rhinoplasty. It is clear that more research needs to be done to detect the most effective dose and time schedule for patients to take it. It is interesting to note that many of the studies did work to build on each other by using the same SinEch17 formula.

**How the information gathered in parts 1-3 can be applied in a clinical setting:** The information from parts 1-3 can be applied in a clinical setting by having patients take the SinEcch A. montana formula post-rhinoplasty at the level seen in the Chaiet and Marcus study since it was proven to decrease ecchymosis and edema post-rhinoplasty. Also, other studies I have mentioned in parts 1 and 2, show its effectiveness as well. In addition, the research from the RCTs about the effectiveness of the homeopathic Arnica montana shows that arnica is safe and is effective in a perioperative setting (13). Since it is safe and effective, it should be suggested for patients to decrease ecchymosis and edema post-rhinoplasty. With regards to the use of steroids for decreasing ecchymosis and edema after rhinoplasty, I would not recommend steroids due to the increase in ecchymosis, as seen in the Totonchi and Guyuron. Although this study seems to be an outlier compare to the others analyzing steroids for post-operative use. The Gurlek study, also found a “decrease in edema and ecchymosis, but not at a statistically significant level” (12). Overall, I would
suggest the homeopathic arnica montana to decrease bruising and swelling post-rhinoplasty in a clinical setting.

**Is there good evidence available to make a clinical decision:** Yes, from the evidence provided in parts 1-3, there is good evidence to make a clinical decision supporting the use of A. montana post-rhinoplasty to decrease ecchymosis and edema. Even though some contrasting evidence was presented, when taking a closer look at the contrasting evidence, it seems that some of the studies were poorly done and the amount of arnica used was very low or the potency was not listed at all.

**Justification for altering the question from part 1**
The question from part one was not altered.
References


