Pain reduction and improvement of range of motion after consumption of MonaVie Active™, an Açai-rich fruit/berry juice blend.

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Abstract

The objective was to evaluate the impact of consumption of an Açai-rich fruit/berry juice blend on pain and range of motion. An open-label clinical pilot study was performed by recruiting 14 study participants with some limitations in range of motion associated with pain and affecting their activities of daily living.

The study participants were supplied with juice for 12 weeks, and instructed to consume four ounces (120 mL) daily for the duration of the study. The study participants went through a medical exam at study entry and exit, and were assessed by a nurse (structured interview, questionnaires, blood samples), and a chiropractor (range of motion assessment). The pain levels were scored using a visual analogue scale (VAS). The ROM assessment was performed using dual digital inclinometry, using the J-Tech wireless system as recommended by the American Medical Association guidelines.

Serum testing showed a significant increase in antioxidant activity already after 2 weeks of consumption, using the CAP-e cell-based antioxidant protection assay. A reduction of inflammation was seen as a reduction of C-Reactive Protein (CRP).

Introduction

The test product for this study was MonaVie Active™ (MVA), a fruit- and berry-based juice blend, with a very high level of anti-oxidants. It contains the following eight exotic fruits and berries that have been studied separately for their high anti-oxidant content: Açai, Pomegranate, Wolfberry (Goji berry), Camu Camu, Passion fruit, Aronia, Acerola, and Bilberry. It also contains 10 more ordinary fruits, including: Apricot, Purple grape, White grape, Lychee, Banana, Kiwi, Pear, Cranberry, Blueberry, and Prune. In addition, MVA also contains glucosamine.

Testimonials claim many types of health improvements after MVA consumption. These include recovery from chronic pain syndromes and improved cardiovascular health. We have previously conducted an *in vivo* study documenting that consumption of four ounces of MV results in an increase in antioxidant activity in the serum, as measured by the CAP-e assay [1, 2] and that this increased serum antioxidant activity translates into positive consequences for oxidative stress, as measured by reduction in lipid peroxidation within two hours after consumption of the juice blend [2].

Based on these data it was of interest to examine whether the increased antioxidant activity may have a positive effect on known inflammatory conditions. For this study, study participants with some degree of joint pain and generalized muscle pain were chosen.

Study design

Fourteen human subjects were enrolled in the 12-week study, to identify the time course of changes in symptoms of pain and reduced ROM. Subjects were monitored at baseline, and after 2, 4, 8, and 12 weeks. Blood was taken at each visit, and a structured nurse interview specifically addressed any subjective changes.

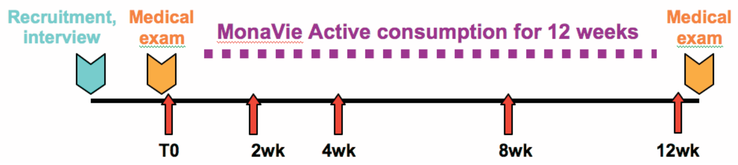


Figure 1. Study design for the 12 week study. Red arrows indicate visits to the clinic, assessment of pain and range of motion, and blood draws.

Vol. #	Gender	Age	Primary Complaint	Other Pain
01	M	84	Joint pain	Agent Orange Rash
02	F	68	Joint pain	Right leg muscular pain
03	F	47	Joint pain - knees	–
04	F	59	Rheumatoid Arthritis	Right knee & hip pain
05	M	51	Chronic inflammation of the spine and lower back	Joint pain - multiple
06	F	44	Joint pain	–
07	F	54	Chronic muscle pain	Knee pain
08	F	59	Joint pain - knees	–
09	F	54	Chronic muscle pain, joint pain	Lupus
10	F	70	Joint pain	Lower back pain right hip/leg pain
11	M	47	Joint pain	Knee & hip pain
12	F	60	Joint pain - knees	Lower back pain
13	M	58	Joint pain - knees	Shoulder, elbow, wrist pain
14	F	47	Joint pain - knees	Hand & finger pain

Results

Range of Motion (ROM)

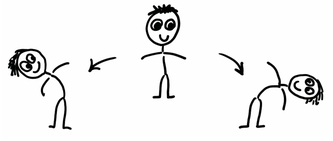
In all study participants, the ROM at baseline was primarily reduced in the lumbar and lower extremity areas. Consumption of MVA resulted in an increase in lumbar and lower extremity ROM as well as an improvement in overall generalized pain for the study group as a whole. Comparison of the means of the grouped data was performed using a two-tailed un-paired (independent) *t*-test. For the lumbar ROM, there was improvement over the entire 12 weeks ($p < 0.02$). Improvement for the lower extremity ROM was observed by 12 weeks ($p < 0.05$).

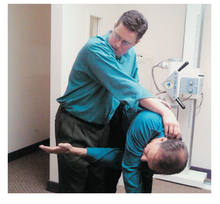
Method for assessing ROM using J-TECH Tracker Freedom® Wireless

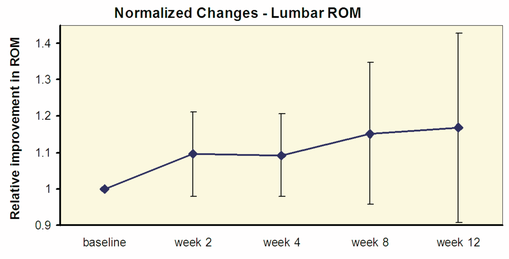
The J-Tech Tracker Freedom® system uses dual inclinometry protocols from the American Medical Association (AMA) and wireless instruments to measure composite range of motion and strength evaluation. This system is controlled with a foot switch; therefore, permitting all instrumented tests to be accurately recorded without returning to the computer. The following instrumented tests were performed for this study:

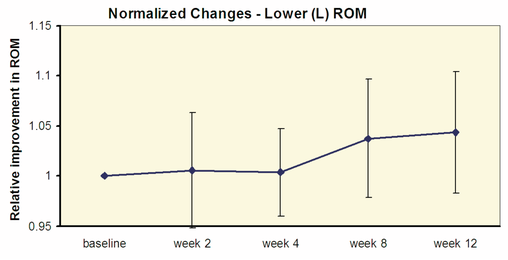
- Dual Inclinometry (range of motion = ROM) for spine and extremities;
- Dynamometer Muscle Testing (strength);
- Algometry (tenderness; pain threshold and tolerance);
- Grip Testing (grip strength).

The assessment was performed by a chiropractor with experience in detailed ROM assessment. Thus, one operator performed all ROM assessments throughout the study.









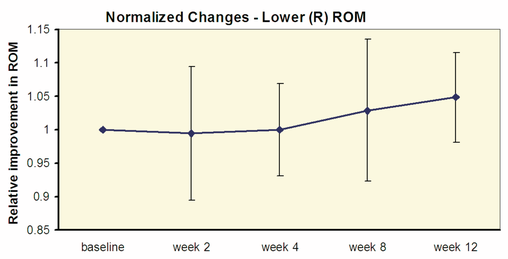


Figure 2. The normalized change in ROM is shown. The improvements are shown for lumbar ROM (top), lower left extremity (mid), and lower right extremity (bottom). Each person's cumulative ROM at study start was set to "1", and improvements in ROM are indicated by higher relative ROM score. The averages of the normalized values are shown for each visit. The vertical bars indicate the standard deviation. The improvement in lumbar ROM reached statistical significance already at 2 weeks ($p < 0.02$), and the improvement in ROM for lower extremities reached significance at 12 weeks ($p < 0.05$).

Pain

The self-reported pain level, as scored on the visual analogue scale, was significantly reduced by 12 weeks of MVA consumption ($p < 0.01$).

Method for assessing pain

A visual analogue scale was used to track current pain levels at each visit. The scale was without increment marks, and was 10 centimeters long. The study participants were instructed to make a mark anywhere on the line reflecting current pain level on the day of the visit. The score was measured on the scale in centimeters.

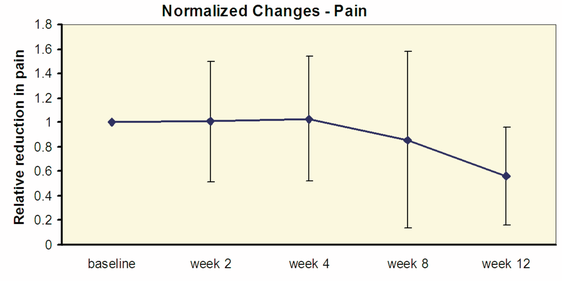


Figure 3. The relative changes in pain scores are shown. Each person's pain score at study start was set to "1", and reductions in pain levels are indicated by lower pain scores. The averages of the normalized values are shown for each visit. The vertical bars indicate the standard deviation. Of the 14 study participants, volunteers 6 and 9 were removed from the pain analysis, because other pain issues complicated the analysis of pain pertaining to the primary complaint at study start. Among the remaining 12 study participants, the pain reduction seen after 12 weeks was highly significant ($p < 0.01$).

Serum antioxidant and inflammatory status

The serum antioxidant status, as monitored by the CAP-e cell-based antioxidant protection assay, was significantly improved already after 2 weeks of consumption of MVA ($p < 0.05$), and kept improving throughout the 12 weeks of study ($p < 0.00001$) (Figure 4).

A reduction in the inflammatory marker CRP was seen after 12 weeks, but did not reach statistical significance ($p < 0.22$).

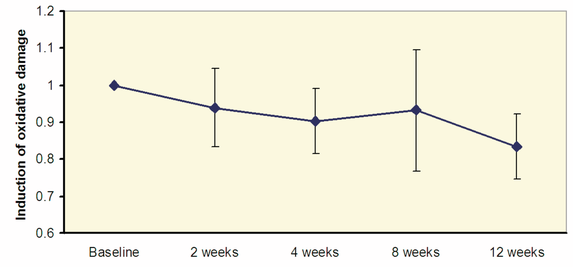


Figure 4. The relative changes in serum antioxidant activity, as measured by the CAP-e cell-based antioxidant protection assay, are shown. Each study participant's serum samples were tested in quadruplicate. The level of oxidative damage that could be induced in the presence of a person's baseline serum was set to "1". Data from later visits were normalized to the baseline. The averages of the normalized values are shown for each blood draw. The vertical bars indicate the standard deviation. The test evaluates whether the addition of serum helps protect cells from oxidative damage in vitro. Serum samples obtained after consumption of MVA contained more antioxidants able to enter into and protect cells from oxidative damage. The improvement was statistically significant ($p < 0.05$).

Conclusions

We conclude that consumption of MVA contributes to quantifiable improvements in motility and relief of pain. This is likely due to an increase in antioxidant activity against oxidative stress, leading to a decrease in inflammatory status.

Acknowledgements

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References

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